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COMPUTERWORLD

Desktop leaders face off

Novell to buy WordPerfect, Quattro Pro

By Lynda Radosevich
and Elisabeth Horwitt
SALT LAKE CITY

■ Novell, Inc.'s planned buyout of WordPerfect Corp. and Borland International, Inc.'s Quattro Pro spreadsheet leaves users in a quandary.

While customers said it should provide much-needed financial support for WordPerfect's product development, they fear it could distract Novell from meeting already ambitious enterprise network goals.

Novell is having trouble both delivering its NetWare 4.1 software and integrating NetWare and Unix. Users also fret that Novell's lack of desktop application experience and reportedly poor support policies would undermine WordPerfect and Quattro Pro support programs.

"Novell has hugely disappointing support. You can't call a number there and get help unless you want to pay $100 to $200 per call, and we're big enough that we shouldn't have to do that," said Dean Johnson, a manager of information systems for special projects at Freudenberg-NOK General Partnership, an auto parts manufacturer in Bristol, N.H.

Novell, *page 14*

Squeeze play

Microsoft's worldwide market share gains are driving consolidation in the PC applications business

Application	1993 revenue*	Percent change from 1992
[illegible]		
WordPerfect	$647M	31%
Microsoft	$845M	35%
Lotus	$154M	(24%)
[illegible]		
Lotus	$599M	19%
Microsoft	$647M	34%
Borland	$79M	(35%)
Database		
Borland	$266M	(10%)
Microsoft	$292M	247%
Claris Corp.	$56M	80%

*Includes suite sales; 1993 revenue based on preliminary numbers

Source: Dataquest, Inc., San Jose, Calif.

Microsoft counterattacks

By Stuart J. Johnston

Microsoft Corp. plans to undermine Novell, Inc.'s network dominance with a Trojan horse strategy built around its object technology and aggressive pricing of Windows NT, according to a confidential company memo obtained by *Computerworld*.

As the Redmond, Wash., software titan looks around hungrily for new markets to refuel its slowing growth rate, networking and server technologies are major candidates, the memo states. Novell's announced intent to purchase WordPerfect Corp. makes the strategy outlined in the memo especially timely.

"Novell *is* this business. We have to take them out," Jim Allchin, vice president of Microsoft's business systems division, said in a

Microsoft, *page 15*

Gerstner downplays host role

By Craig Stedman

IBM Chairman Louis V. Gerstner last week tried to get the "vision thing" monkey off his back by laying out a strategic road map for returning the vendor to prosperity. But he gave few specifics about the vehicles IBM will use to get there.

Gerstner, in a speech to financial analysts in New York, highlighted key changes ahead:

▶ A client/server strategy that revolves around basing the OS/2, AIX and OS/400 operating systems on PowerPC microprocessors and a common microkernel. The commonality will mean faster software development, lower prices and more consistency among IBM's non-mainframe systems.

▶ A "massive redeployment" of re-

Gerstner, *page 6*

Outsourcing

Xerox signs up EDS

By Mark Halper

in an apparent bellwether of change in the outsourcing field, a financially sound Xerox Corp. last week said it will hand over its IS operations to Electronic Data Systems Corp. The deal could be worth as much as $4.1 billion over 10 years.

Xerox's decision to outsource symbolizes the growing willingness of fiscally solid companies to enter such arrangements. Outsourcing has more typically been the province of companies needing immediate cash infusions and quick cost savings.

"'It's a watershed deal," said Howard Anderson, managing director at The Yankee Group in Boston. "There's a whole raft of other companies who will seriously consider the outsourcing option with the idea that Xerox did it."

Xerox showed an operating profit of $620 million on sales of

Xerox, *page 10*

Billion-dollar babies

The EDS/Xerox deal is near the top of the list of biggest outsourcing contracts. These contracts will last for approximately 10 years.

Customer	Vendor	Value (billions)	Year Signed
Xerox Corp.	EDS	[illegible]	*
McDonnell Douglas Corp.	ISSC	[illegible]	1992
General Dynamics Corp.	CSC	[illegible]	1993
Continental Airlines	EDS	[illegible]	1994
Lufthansa German Airlines (Germany)	EDS	[illegible]	*
Inland Revenue Service (UK)	EDS	[illegible]	*
British Aerospace PLC (UK)	CSC	[illegible]	1994
KF Group (Sweden)	EDS	[illegible]	1993
Canada Post (Canada)	SHL	[illegible]	1993

*Deals pending

Source: Merrill Lynch & Co., New York

Utilities plug into client/server

By Joseph Maglitta

Three of the nation's leading electric utilities are crackling with plans for big client/server rollouts.

Those plans are driven in part by competitive pressures that have sent electric and gas utilities around the world scrambling for new ways to harness information technology for survival and growth. These factors include deregulation, environmental pressures, privatization, globalization and sagging profits.

Among the utilities making a move are the following:

▶ Entergy Corp., a $6 billion New Orleans-based power supplier, will this week announce plans to move corporatewide applications to client/server systems provided by Sun Microsystems Computer Corp. The new systems will support 6,500 users on 300 LANs.

"Utilities have a chance once every 20 years to redo their technology. This is it."
Brad Holcombe
Andersen Consulting

▶ Florida Power Corp. in St. Petersburg last week said it was in the final phases of a three-year, $48 million rollout of a new open network, customer service system and other applications based on Hewlett-Packard Co. client/server technology.

▶ Pacific Gas & Electric Co. said it expects a March 1995 introduction of a client/server-based customer service system for 20,000 key industrial accounts. The $10.6 billion firm, based in San Francisco, is the nation's largest public utility.

The reason for this rush to client/server is clear. "Until recently,

Utilities, *page 8*

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THE CW GUIDE TO WIRELESS

when wireless?

Wireless data communications works — if you have vast resources to deal with the cost and complexities. It's "too expensive, coverage is not broad enough, the applications are not there, the batteries don't last long enough, and the equipment is too large and clunky," says Dick Schaffer, a principal at Technologic Partners in New York. PAGE 78.

COMMENTARY

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■ **Marc Dodge** says the mainframe and the PC are both dead — and alive and well. *Page 35*

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Executive Briefing

Free money! The Detroit Public Library, Magic Valley Regional Medical Center and other nonprofits are financing new information systems with grants from private and government sources. You can do it too — if you know where the money is and how to play the game. *Page 65*

Customers are ruffled by **Novell's** plans to purchase **WordPerfect** and **Borland's** Quattro Pro spreadsheet. Some are worried about Novell's splintered focus and declining support. Others see the move as saving WordPerfect and Borland from themselves and as opening up possibilities for better network applications. *Page 1*

Forces such as environmental pressure, slumping profits and globalization are driving three of the nation's major electric utilities — **Entergy Corp., Florida Power Corp.** and **Pacific Gas & Electric** — toward client/server technology and open systems. *Page 1*

EDS wins the big one: Xerox agrees to go with EDS on what could be the largest outsourcing contract ever. *Page 1*

Increased interest in disaster recovery is pushing some companies to buck the data center consolidation trend and open remote facilities as internal hot sites. Data center managers at the AFCOM conference said the remote facilities should allow faster recoveries than they could get at external hot sites, although the cost is prohibitive for some companies. *Page 8*

When Harvard University taps its alumni for a new wave of contributions, a client/server system will not only keep track of the cash flow but will help to manage the delicate negotiations needed to bring in some multimillion-dollar donations. *Page 47*

The question lingers, do you replace your outdated PCs or upgrade them? Some users say the financial benefit lies in upgrades such as reworking old memory chips. *Page 39*

Users need to modernize their network security practices, computer security experts say. *Page 28*

Management guru Tom Peters tells CIOs that weird is good, re-engineering is flawed, outsourcing is dumb and narrow return on investment analyses are worse. *Page 71*

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SOUND OFF!

The topic? Faulty software. The argument? Two lawyers debate whether faulty software is a real problem for users or merely a way for attorneys to make money. Either way, user companies should scrutinize their warranties.

MARK ALCANEZ

Boston trial lawyer Bruce A. Bierhans

KATHERINE LAMBERT

ITAA general counsel Ronald J. Palenski

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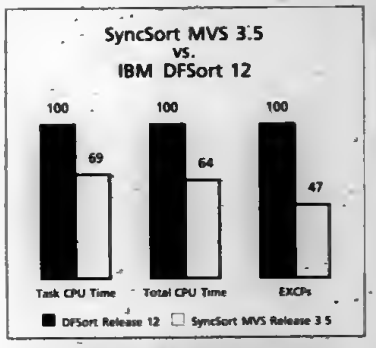

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Taligent goes public with operating system

Developers are slow to sign on

By Ed Scannell
PHOENIX

■ Taking the first steps in what it figures will be a long journey to market acceptance, Taligent, Inc. last week gave its first public demonstration of the application frameworks that compose a significant part of its object-oriented operating system.

At the PC Forum conference held here, company officials demonstrated via their "people, places and things" concept how easy it will be for corporate and third-party developers to create customized applications and navigate the system.

One of the strengths of the operating system, which company officials said will be delivered by the end of 1995, is its ability to transparently integrate various data types from multiple environments — including DOS, Windows and Unix environments — into a single document.

"The way you can pick up any pen to write on any piece of paper is the way we want people to think of Taligent and the way it works with different applications," said Mike Potel, Taligent's vice president of technology development.

Also key was Taligent's claim that due to the operating system's object-oriented architecture, applications can be written with much less code than comparable programs running in environments such as Windows. To illustrate, Taligent demonstrated an application that consisted of only 100 lines of code. The same software for Windows would require several thousand lines of code, Potel said

Users hesitate

While many attendees were impressed with the technology, a show of hands at the conference revealed only one out of 500 or so is actively developing for Taligent.

"It's impressive stuff, but it's a long way from being relevant to anything we are looking at right now," said one information systems professional at a large New York-based bank.

Sixty developers have already committed to writing applications for the second series of application frameworks, which are due out later this year and will allow developers to fully exploit the operating system, according to Taligent Chairman and Chief Executive Officer Joe Guglielmi.

The first set of frameworks allows developers to infuse existing applications with advanced features such as sophisticated data manipulation and three-dimensional graphics. The second set will let developers more fully exploit the Taligent system by writing sophisticated collaborative applications that take advantage of the operating system's user interface.

As demonstrated, the "people, places and things" concept extensively uses icons that represent office objects such as phones, fax machines and business cards. Users can drag a business card onto a phone or fax icon and have their modem automatically dial the number. Or they can drag the card into a data-entry form so the data transfers automatically into the correct database fields.

Different pace

While Taligent is delivering the frameworks to both co-parent companies — IBM and Apple Computer, Inc. — at the same time, IBM appears to be working with the technology much more aggressively than Apple. The latter has been quiet about its implementation plans.

"IBM is looking closely at the various versions of the [frameworks] as we deliver them, but Apple isn't doing much until we deliver the final product," Guglielmi said. "It may be because Apple doesn't yet have a preemptive multitasking operating system."

As time goes by

IBM and Apple plan to have the Taligent operating system out by mid-1995. 1994 will be a year of testing and pre-releases.

Early Experience kit: First-half 1994
Gets early feedback
Goes to 100 developers
Programming model
Prototype applications

Beta release: End of 1994
Will contain portable Taligent Application Environment (TAE)
Broad-based developer's kit
Partner development programs

Release 1.0: Mid-1995
Has complete graphical interface
Simultaneous partner releases
Broad-based marketing campaigns

Operating systems

Users seek Unix/NT coexistence

By Jean S. Bozman
SAN FRANCISCO

Unix's grip on the enterprise server may not be under siege yet from Microsoft Corp.'s Windows NT, but NT will increasingly challenge it this year at the workgroup and LAN levels, according to users and vendors attending last week's UniForum trade show and conference.

A primary issue for users, however, is clearly one of coexistence between Unix and NT.

During one of the conference sessions devoted to NT, a consultant asked a packed room of more than 400 users, "Five years from now, do you believe you'll be running your business on Unix or on Windows NT?"

While only a smattering of the audience singled out one or the other operating systems, the vast majority identified Unix and NT together as their future operating environments.

New, improved OSF

Ever-conscious of this competitive threat from Microsoft, a host of Unix vendors announced a revamped Open Software Foundation (OSF), with eight corporate sponsors — double the previous number. The new group will house the Common Open Software Environment (COSE) group created at UniForum last year [CW, March 7]. It will also coordinate specifications development closely with X/Open Co., which will later certify the open systems standards.

"I would have loved to have seen Microsoft up here [on the stage], too," said Bill Estrem, project leader at 3M Co.'s Information Architecture group in St. Paul, Minn. "Whether or not they join this group is not important to me. But if they [Microsoft] can conform to the [OSF] specifications, it would make my life much easier. We're going to be using both [Unix and Windows NT], and we like them both."

Ted Hanss, president of the former OSF's end-user steering committee, said user interest in Unix/NT coexistence is "definitely happening," although users are still puzzling over how to make the two interoperate without more connectivity middleware products.

Customers viewed the new Unix group as a hopeful sign that vendors want user feedback on proposed Unix standards — something that was impossible with COSE. Now, users will be included on the OSF board, in planning committees and as advisors to specific project working groups.

Representative attitude?

Yet after years of abortive attempts at Unix unity groups, many users may adopt the attitude expressed by David Sherr, a first vice president of information technology at Lehman Brothers in New York.

"Who really cares anymore?" Sherr asked. Another user pointed out that while the OSF committees argue about standards, Microsoft will be "out in the market establishing two or three new de facto standards."

David Tory, who will remain OSF's chief executive officer, said the new OSF board will meet in mid-April to decide on a new name and discuss the details of downsizing the 300-employee staff by at least one-third.

OSF products will continue to be enhanced until their next release, Tory noted, including the planned DCE 1.1 distributed computing software suite set for release at year's end. Also coming are the OSF/1 1.3 operating system and OSF/Motif 2.0 graphical user interface.

UniForum

Million-dollar club

The new OSF sponsors, each of which agreed to pay $1 million annually, include AT&T Global Information Solutions, SunSoft, Inc., a subsidiary of Sun Microsystems, Inc., Novell, Inc. and Fujitsu Ltd. — double the previous number of OSF sponsors. They join former sponsors IBM, Digital Equipment Corp., Hewlett-Packard Co. and Hitachi Ltd. — plus eight other associate sponsors that paid less.

Sun addresses user Wabi woes

By Jean S. Bozman
SAN FRANCISCO

Next month's delivery of Wabi 1.1, a new release of Sun Microsystems, Inc.'s Windows application programming interface, will fix flaws discovered after Wabi 1.0 shipped late last year, a Sun official said.

Andy Halford, director of engineering at Sun business unit SunSelect in Chelmsford, Mass., did not provide specifics about the bugs, which analysts said have created problems for at least one of the 13 Windows applications that Wabi supports.

The problems reportedly include some difficulty installing some of the Windows applications that run over Unix. "SunSelect said earlier this month that one of the harder challenges wasn't so much running the Windows applications as properly installing them," said Tony Iams, a research analyst at D. H. Brown Associates, Inc. in Port Chester, N.Y.

Repairs were made before Wabi resellers Hewlett-Packard Co. and IBM shipped Wabi code with their workstations, according to SunSelect.

Wabi Wanna-bes

SunSelect makes the Wabi software that runs Windows applications on top of Unix operating systems. Hewlett-Packard Co. and IBM have said they will ship Wabi with their workstations, but so far only SunSoft, Inc. has been shipping the software.

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1	1	GE MOTORS Detroit
2	2	EXXON Irving, Texas
3	3	FORD MOTOR Dearborn,
4	4	INTL. BUSINESS MA
5	5	GENERAL ELECTRIC
6	6	MOBIL Fairfax, Va.
7	7	PHILIP MORR
8	8	E.I. DU PO
9	10	CHEVRON
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Cobol seeks new life in object world

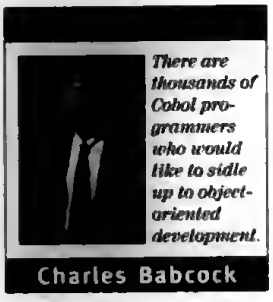
Cobol has been relentlessly criticized since its birth in 1959, but instead of meeting predictions of its imminent demise, it is about to undergo another permutation. This fall, Micro Focus, Inc. in Palo Alto, Calif., will offer the first version of object-oriented Cobol.

It may be hard to see Cobol in this role, and there won't be any stampedes in its direction by Smalltalk and C++ adherents. But there are thousands of Cobol programmers who would like to sidle up to object-oriented development. Many will do so using the language they know best, once they get the chance.

This may not be as simple as it sounds, because the underlying concepts of Cobol are somewhat the antithesis of object-oriented thinking.

Granted, thousands of C programmers eased into the world of objects through the object-oriented extensions to C, now known as C++. The latter remains a hybrid language that allows conventional C features alongside object-building capabilities.

A central concept of object-oriented development is creating a base class of objects with subclasses inheriting characteristics from it. Unlike objects created in Smalltalk, a purer object-oriented language, C++ objects can inherit characteristics from multiple base classes, which can lead to complications in an object-oriented system. Nevertheless, C++ has gained popularity while other languages have languished.


There are thousands of Cobol programmers who would like to sidle up to object-oriented development.
Charles Babcock

Another object-oriented language that tried to combine the best of Smalltalk into a C-like language was Objective C. For some reason, it never caught on except with programmers working with Next Computer's NextStep, whose class libraries are written in Objective C.

Object-oriented Cobol may have a better chance of getting established than Objective C because it has the same inherent advantage as C++. It represents a familiar language that retains its features as it takes an evolutionary step toward a new way of doing things.

Is this the best way to move toward object-oriented development?

Many object-oriented experts say no. They say Cobol programmers need to break with their past to adopt the underlying tenets of the object-oriented approach. The Cobol programmer is taught to subdivide a business task into smaller parts until a function acting on data can accomplish some small slice of it.

Functional decomposition goes in the opposite direction of forming the higher level abstractions of objects. Objects are discrete modules of code that communicate with one another through messages, simulating real world business entities and processes.

But the differences can be overstated. Object-oriented development remains something less than an exact science, organized around a few key concepts. CICS programmers, which include many Cobol developers, are used to working in an event-driven environment akin to object-oriented environments.

Dan Clarke, product manager of object-oriented Cobol at Micro Focus and chairman of the former task force that came out of the Scottsdale Symposium on Cobol in 1989, says some of the experts' fears that Cobol programmers can't make the transition are actually a form of condescension. Many of them will learn to apply object-oriented rules as well as anyone else, he says.

And it's hard to see how businesses are going to embrace the world of objects if most of their Cobol programs can't be moved over to it.

Like C++ before it, object-oriented Cobol is likely to expand the number of programmers working with objects and help move legacy systems closer to the age of distributed systems.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

Unisys merges processing

By Thomas Hoffman

■ Unisys Corp. last week introduced a mainframe-class database server that allows on-line transaction processing (OLTP) and decision-support operations to run simultaneously against production data.

While observers agreed the capability could unlock a whole new trove of applications, they questioned whether users would pay the stiff price tag — $750,000 to $8 million — for the multiprocessing machines, which work with IBM, Digital Equipment Corp. and Unix-based systems.

Running simultaneously

The system, called DataCentral, allows both transaction and query processing to occur at the same time, and against the same database, without performance lapses. Historically, users have had to maintain separate database environments for OLTP and decision-support functions. Each kind of activity has different functional characteristics.

With DataCentral, because both kinds of processing can take place at once, users need just one centralized database environment and thus less disk space. Another benefit is the ability to extract OLTP data for use in decision-support applications.

DataCentral includes up to 32 parallelized CMOS processors that interface with high-speed disk caching systems. With DataCentral, up to 85% of OLTP data can be off-loaded into the attached disk caching subsystems through fiber-optic connections, thereby freeing up necessary storage space for users to conduct query searches against their databases.

Unisys executives said DataCentral is being targeted at user firms with large customer information systems requirements such as airlines, hotels, banks and retailers.

DataCentral's capabilities

DataCentral runs on the DataCentral Operating Environment, a Unisys-created operating system that combines OLTP and query capabilities. The database server can interoperate with any database environment that adheres to X/Open Co.'s Distributed Transaction Processing model or supports Sybase, Inc.'s Open Client/Open Server model.

DataCentral can interface with IBM mainframes, Digital VAXs or Unix-based platforms via IBM's SNA, TCP/IP, Open Systems Interconnect or Fiber Distributed Data Interface links. But for all the snazzy features that DataCentral promises, the system's lofty price tag could be a key stumbling block for prospective customers.

Another problem for non-Unisys customers is one of translation. "It would require some work by MIS to port databases into DataCentral," acknowledged Del Bloss, president of Unisys' Airline Systems division.

Gerstner downplays

CONTINUED FROM PAGE 1

sources away from mainframes to client/server technologies. Yet customers "continue to insist that mainframes are critical to their businesses," and IBM has high hopes for its new CMOS-based System/390 parallel processors.

IBM's failure to capitalize on client/server and distributed computing trends "is the single most important mistake" it has made in the last decade, according to Gerstner.

Corporate users expressed little concern about IBM's commitment to mainframes. "I did not hear [Gerstner] say he's abandoning the mainframe world, just that he's putting more emphasis on client/server," said Tom Trainer, vice president and chief information officer at Reebok International Ltd. in Stoughton, Mass.

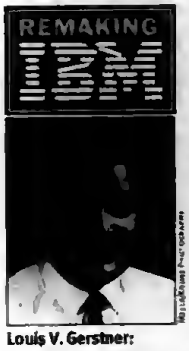
James Cassell, an analyst at Gartner Group, Inc. in Stamford, Conn., said IBM will not need to spend as much money on mainframes because CMOS systems cost less to develop and produce.

But users may need more convincing on the merits of the microkernel plan. Tom Loane, vice president of computers and communications services at Alamo Rent a Car, Inc. in Fort Lauderdale, Fla., said he views the microkernel effort "more as [IBM's] cost-containment effort" than something that will provide value.

James Cannavino, IBM's strategy chief, said a 32-bit version of the microkernel will be introduced for OS/2 later this year and expanded to AIX later. A 64-bit version should be ready for implementation with OS/400 during 1996.

As planned [CW, Jan. 17], Gerstner left almost all details to be filled in at later dates on a product-by-product basis. "We're not going to announce them as strategies; we're going to announce them as products," Cannavino said.

IS executives appeared neither surprised nor put off by the lack of detail. "I don't care what [Gerstner] says. What we need are real products at real prices, and the jury is still out on that," Loane said.



Louis V. Gerstner: *Vision now, details later*

"I have an old saw that while you're designing the perfect bandage, the patient is bleeding to death," said Tod Dixon, vice president of information resources at Northeast Utilities in Hartford, Conn. Gerstner rightly focused on "stopping the hemorrhaging" at IBM first, not decreeing strategy, Dixon said.

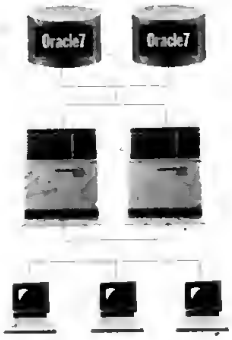
Gerstner vowed to "exploit our technology" better, both for end-user and OEM sales. Changing IBM's corporate culture to emphasize aggressive execution of product plans is the company's "most important strategic priority," he said. He also plans to focus the company's "information superhighway" marketing efforts more on businesses than consumers. "I think the business market will arrive first," Gerstner said.

Analysts described Gerstner's comments as a necessary exercise in vagueness. "What he came out with was almost the obvious," Cassell said. "Now they just have to get stuff out on the street and sell some of it."

Ed Scannell and Thomas Hoffman contributed to this article.

Oracle7 Parallel Server: Breaking the Single Server Limit.

Applications built using a first-generation client/server database cannot access data on more than one server computer without a lot of extra programming. In contrast, the Oracle7 Parallel Server database enables applications to access data on multiple server computers just as if all the data was stored on a single server. Which is one reason why 9 out of the top 10 Fortune 500 companies run Oracle7 on their parallel systems.

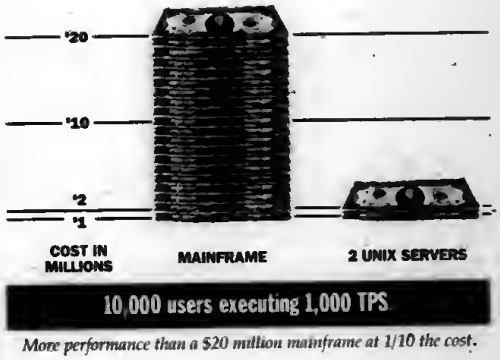


Speed and Scalability

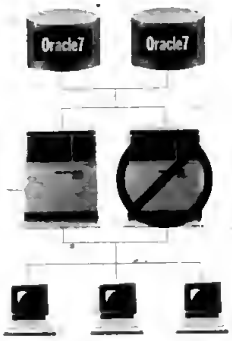
Performance is increased simply by adding another server. Two UNIX servers running Oracle7 were independently certified as supporting 10,000 users running 1,000 TPC-A transactions per second.

Reduced Cost

UNIX computers running Oracle7 Parallel Server support more users and more transactions per second than a mainframe. The cost savings are enormous.



More performance than a $20 million mainframe at 1/10 the cost.



Reliability

Parallel servers offer high reliability because there is no single point of failure. If one server goes down, Oracle7 allows other server(s) to continue running your application.

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ORACLE

News Shorts

AMR consolidates Sabre groups

AMR Corp. has created an umbrella organization called **Sabre Decision Technologies** that includes its American Airlines Decision Technologies, Sabre Development Services and the Transportation Automation Services unit of AMR Information Services. The unit will employ more than 3,000 staffers and result in an undisclosed amount of staff downsizing, particularly in redundant areas such as customer and help desk services.

Novell to build Global MHS into NetWare

Novell, Inc. plans to incorporate Global Message Handling Service (MHS) and directory components into NetWare 4.1, which is due to ship in the fourth quarter, Novell product line manager Ron Cully said last week. NetWare Directory Services (NDS) will become the single directory for both NetWare 4.1 and messaging services. It is also the preliminary step to phasing out Global MHS as a separate product, although users will still have to buy Global MHS for a year or so to get gateways to other messaging systems, such as X.400, Simple Mail Transfer Protocol and IBM's SNA Distribution Services, Cully said.

CSC closes with British Aerospace

Computer Sciences Corp. late last week said it closed its outsourcing deal with **British Aerospace**. The final deal included some adjustments over the arrangements announced last fall [CW, Nov. 22, 1993]. CSC will hire about 1,500 British Aerospace workers; it originally intended to hire 1,250. The value of the contract has increased from $1.35 billion to $1.5 billion. The contract, which takes hold April 1, includes CSC support of British Aerospace's troubled AVRO civil aircraft division. AVRO was not part of the preliminary agreement.

CD-ROM patent overturned

A controversial patent awarded last summer to **Compton's New Media**, a Tribune Co. unit, was overturned by the U.S. Patent and Trademark Office last week. The patent, which covered a common technique for recording multimedia to CD-ROM, was jointly held by Compton's and Encyclopaedia Britannica, which sold Compton's to Tribune Co. last September. Tribune has 60 days to appeal the decision or file a narrower patent, a company spokesman said. The original patent award last August prompted howls of protest from software developers, who faced having to license the recording technique from Compton's.

Unisys adds to SMP line

Unisys Corp. introduced a line of Unix-based symmetrical multiprocessing servers designed to handle high-volume on-line transaction processing applications. The U 6000/500 servers, which run on the Unisys Unix System V Release 4/MP operating system, are equipped with **Intel Corp.** Pentium processors. A dual 60-MHz Pentium configuration, available now with a version scalable up to five Pentium processors, will begin shipping in the second quarter. Prices will range from $15,000 to $100,000.

SHORT TAKES **Rockwell International Corp.'s Space Systems Division** outsourced data processing to **Software Maintenance Specialists** in Santa Ana, Calif., in a two-year deal with a third-year option that values the contract at about $12 million. . . . **Delrina Corp.** introduced a PC fax "mailbox" service that receives and stores faxes.

More news shorts, *page 16*

Remote sites aid data recovery

By Craig Stedman
ATLANTA

■ Heightened interest in disaster recovery capabilities is pushing some information systems organizations to buck the data center consolidation trend and open remote facilities that can handle some production systems work while also serving as internal hot sites.

At the Association for Computer Operations Management (AFCOM) spring conference here last week, data center managers said the remote facilities should allow easier and faster recoveries from outages at their main data centers than through external hot sites alone.

"You can have real live recovery," noted Jeffrey Szymanski, manager of computer operations at the Presbyterian-University Hospital of Pittsburgh. "We won't have to build our database again if a disaster occurs because the data will already be" at the remote data center.

The hospital, which is affiliated with the University of Pittsburgh, plans to split its Digital Equipment Corp. systems between its data center and a new facility targeted for completion by March 1996, Szymanski said. Dual shadowing of disk drives would be used to copy data to both locations.

The remote data center would be run "completely lights-out," with all control and tape backup activities managed from the main site, Szymanski said. The hospital will continue to rely on the university's data center for disaster recovery on its IBM mainframes.

The Federal National Mortgage Association (Fannie Mae) in Washington has an external hot site contract with IBM. However, operations manager Robert Bilodeau said Fannie Mae is also outfitting a remote data center to house an air-cooled ES/9000 that could provide fast recovery for some of its key applications. Those applications "have to come up within a half-hour" of an outage, Bilodeau noted.

Nova Corp., a natural gas company based in Calgary, Alberta, consolidated its Digital-based pipeline systems into its mainframe data center in 1992. But Brian Brookbanks, team leader for computer operations and planning, said the company is considering moving some of its mainframe operations to an unattended remote site as part of a disaster recovery project.

Real disaster

Unattended remote data centers are becoming "a major reality for people, now," both as a growth path and for disaster recovery purposes, said Arnold Farber, principal at Farber/LaChance, Inc., a data center automation consultancy in Richmond, Va.

Hot sites alluring but costly

"All the eggs are in one basket now," Brookbanks said, noting that disaster recovery has become a much higher priority with Nova's management. The company will also consider an external hot site arrangement, but Brookbanks said he sees a need to build redundancy in-house in order to "provide as high a level of service as I'm used to."

Other data center managers said remote internal hot sites are alluring but costly. "It makes a lot of sense, but it's expensive," said William Townsend, manager of the computer services organization at Air Products and Chemicals, Inc. in Allentown, Pa.

Summit Information Systems, Inc., the IS subsidiary of Roadway Services, Inc. in Akron, Ohio, evaluates the need for an internal hot site each year after testing its external arrangement with Comdisco, Inc. But Stephen Buckus, manager of computer operations for Summit, said Comdisco's recovery time of 24 to 36 hours remains good enough for Roadway's business units.

Utilities

CONTINUED FROM PAGE 1

utilities have not had much competition," said David Miller, senior vice president of corporate services at Florida Power. "But competition is coming quickly. Technology can help us deal with that."

A reason to redo

Adjusting to a new environment in which energy customers will be able to choose the best prices from multiple suppliers dominated the International Utilities Executive Conference/94 held last week in Amelia Island, Fla.

Speaker after speaker at the three-day event sponsored by Andersen Consulting urged senior executives to exploit technology to protect current business and branch into new areas, including telephone service and offerings on the information superhighway.

"Utilities have a chance once every 20 years to redo their technology," said Brad Holcombe, a partner at Andersen Consulting. "This is it."

That thought is not lost on Entergy, Florida Power or PG&E.

While Entergy officials were not available to elaborate, a Sun spokesman said the 2.3 million-customer utility will initially deploy nine SPARCcenter 2000 data center servers and six SPARCserver 1000 systems. TCP/IP and Network File System (NFS) will be standard networking protocols.

Florida Power, a $1.7 billion investor-owned firm, said it replaced an IBM SNA network and 150 Novell, Inc. LANs with private 50M bit/sec. lines with T1 spurs linking TCP/IP networks from HP.

The new system will use Unix servers from HP and run Oracle Corp. databases linked to an IBM ES/9000 Model 820 host, according to Don Higgins, manager of technical services at Florida Power. The last of 3,000 Dell Computer Corp. PCs for customer service and administrative users will be operational in January, Higgins said.

The utility serves 1.2 million customers in central and northern Florida.

Florida Power is also due to get a new director of information services. Terry Tyler, an executive at Texas Utilities Co., will take over on April 4. Higgins has been acting director.

Utilities' priorities

The top technologies:
- Client/server
- LANs/WANs
- Geographic information systems

Most important focus:
- Customer service
- Systems development
- Purchasing/Sourcing

Source: CSC Index, Inc., Cambridge, Mass.

The PG&E project, which began three months ago, will employ Sun workstations and Sybase, Inc. databases, said Leo Conner, manager of PG&E's customer information systems department.

The current system, which uses an IBM mainframe and dumb terminals, handles 250,000 bills and nearly 1 million calls a month, Conner said.

"But there's a big risk if it goes down because it could take three or four days to get back up," he said. "The overall strategic intent is to get off the mainframe and allow the system to change as rapidly as the business."

Midwest bureau chief Ellis Booker contributed to this story.

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Xerox signs EDS

CONTINUED FROM PAGE 1

$14.6 billion in its most recent fiscal year. While the company recorded a loss of $813 million after restructuring write-downs, analysts view Xerox as a healthy company that has successfully shed non-core businesses to focus on the document business.

Although Xerox is not the first company to outsource in good times, "they're such a glaring, huge example of a healthy company doing it that this is going to get the attention of others," said Steve McClellan, an analyst at Merrill Lynch & Co.

Xerox Chief Information Officer Patricia Wallington refused to provide any details until the deal is signed.

A Xerox spokesman said that although the company expects to "achieve considerable savings," it was motivated to outsource by other reasons as well: to speed the rate at which it can move to new technologies and to free management to focus on strategic information management issues instead of on day-to-day concerns.

Analysts said they expect that $40 billion chemical giant Du Pont Co. may be next. Du Pont officials could not be reached for comment, however.

Xerox and EDS said they will discuss specifics after the agreement is signed, which Xerox said should be by June or July.

Xerox CIO Patricia Wallington: *Declined to discuss details*

The Xerox spokesman said EDS will take over data center operations, worldwide voice and data communications, desktop system support and legacy software support. Xerox will retain control over "information management functions that focus on strategy, architecture and new application development to support business process re-engineering."

An EDS spokesman said the outsourcer will also undertake new client/server projects for Xerox. Susan Scrupski, editor of "The Integrator," a Barnegat, N.J.-based newsletter, said she expects EDS' involvement in visible client/server work will help the company shed its mainframe image.

Minority untouched

About 2,000 of Xerox's 2,700 information systems staffers will be affected by the outsourcing contract. The other 700 are involved in architecture, strategy and application development, according to the Xerox spokesman.

While many of the 2,000 will transfer to EDS, some will be subject to work force reductions as part of Xerox's ongoing corporate plan to cut its 100,000-person work force to 90,000 by 1996, the spokesman said.

The Xerox spokesman did not elaborate on why the company chose EDS over IBM's Integrated Systems Solutions Corp. That Xerox chose EDS over ISSC bears the mark of IBM Chairman Louis V. Gerstner on its outsourcing practice: Where not long ago ISSC might have shorn margins to win the job, this time it opted to protect its bottom line, analysts said.

Analysts added they were impressed with the alacrity of Xerox's outsourcing evaluation. The company began a feasibility study six months ago. Evaluations can drag on for well over a year.

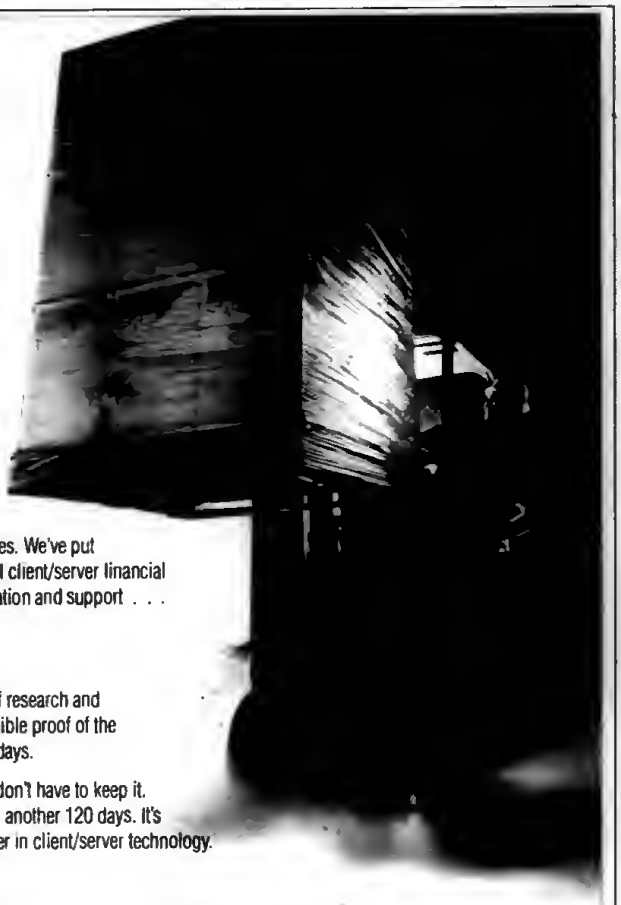
"They've moved so fast because they don't want their people on pins and needles," said William Rabin, an analyst at J. P. Morgan Securities, Inc.

Behind the scenes

EDS, ISSC and CSC each spent more than $1 million vying for the Xerox job, said The Yankee Group managing director Howard Anderson.

EDS will take over Xerox data centers in Rochester, N.Y., the UK and Brazil.

One source said IBM Chairman Louis V. Gerstner was prepared to sell IBM's printer division, Pennant Systems, because it competes with Xerox and therefore hurt ISSC's chances of winning the deal.



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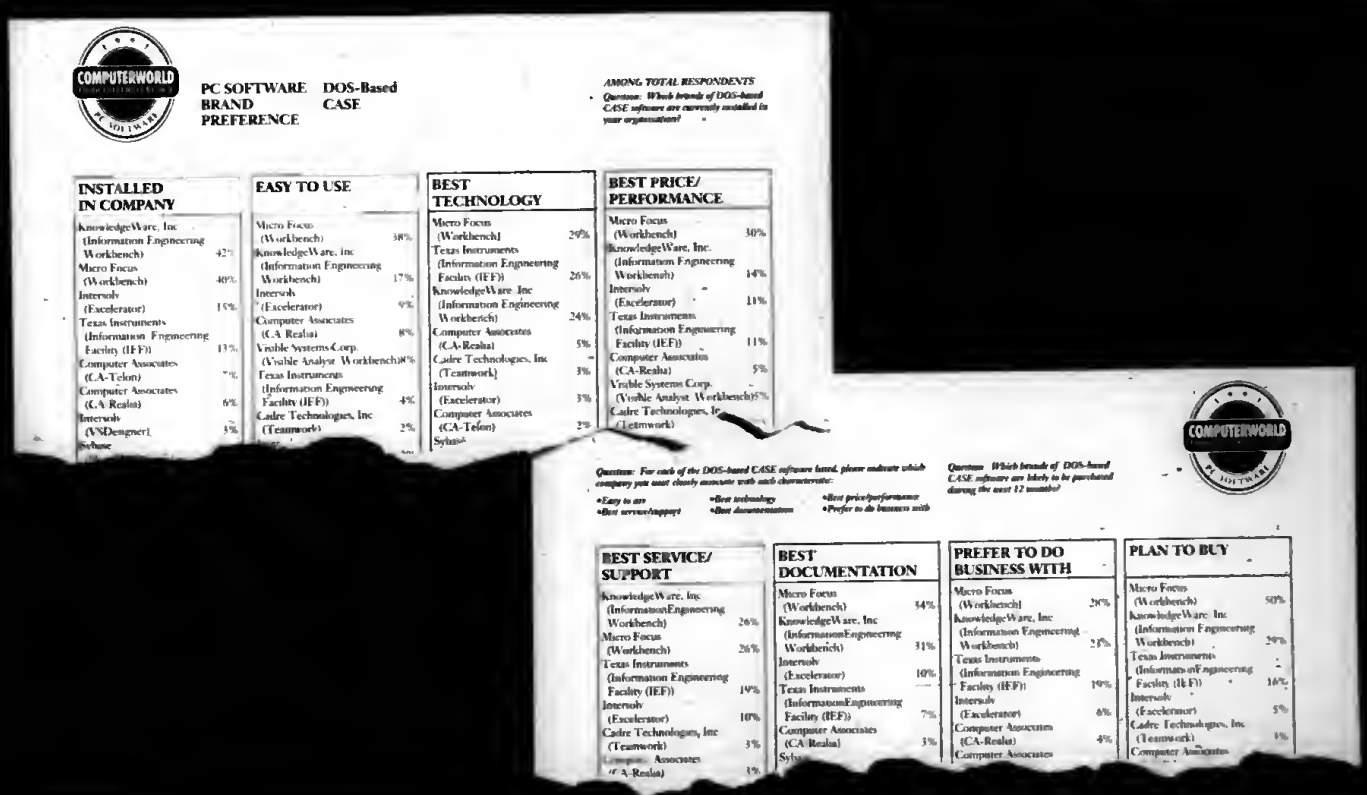

COMPUTERWORLD 1993 PC SOFTWARE

PC SOFTWARE BRAND PREFERENCE — DOS-Based CASE

AMONG TOTAL RESPONDENTS

Question: Which brands of DOS-based CASE software are currently installed in your organization?

INSTALLED IN COMPANY	
KnowledgeWare, Inc (Information Engineering Workbench)	42%
Micro Focus (Workbench)	40%
Intersolv (Excelerator)	15%
Texas Instruments (Information Engineering Facility (IEF))	13%
Computer Associates (CA-Telon)	[illegible]
Computer Associates (CA-Realia)	6%
Intersolv (VSDesigner)	3%
Sybase	[illegible]

EASY TO USE	
Micro Focus (Workbench)	38%
KnowledgeWare, Inc (Information Engineering Workbench)	17%
Intersolv (Excelerator)	9%
Computer Associates (CA-Realia)	8%
Visible Systems Corp. (Visible Analyst Workbench)	8%
Texas Instruments (Information Engineering Facility (IEF))	4%
Cadre Technologies, Inc (Teamwork)	2%

BEST TECHNOLOGY	
Micro Focus (Workbench)	29%
Texas Instruments (Information Engineering Facility (IEF))	26%
KnowledgeWare, Inc (Information Engineering Workbench)	24%
Computer Associates (CA-Realia)	5%
Cadre Technologies, Inc (Teamwork)	3%
Intersolv (Excelerator)	3%
Computer Associates (CA-Telon)	2%
Sybase	[illegible]

BEST PRICE/ PERFORMANCE	
Micro Focus (Workbench)	30%
KnowledgeWare, Inc. (Information Engineering Workbench)	14%
Intersolv (Excelerator)	11%
Texas Instruments (Information Engineering Facility (IEF))	11%
Computer Associates (CA-Realia)	5%
Visible Systems Corp. (Visible Analyst Workbench)	5%
Cadre Technologies, Inc (Teamwork)	[illegible]

Question: For each of the DOS-based CASE software listed, please indicate which company you most closely associate with each characteristic:

•Easy to use •Best technology •Best price/performance •Best service/support •Best documentation •Prefer to do business with

Question: Which brands of DOS-based CASE software are likely to be purchased during the next 12 months?

BEST SERVICE/ SUPPORT	
KnowledgeWare, Inc (InformationEngineering Workbench)	26%
Micro Focus (Workbench)	26%
Texas Instruments (Information Engineering Facility (IEF))	19%
Intersolv (Excelerator)	10%
Cadre Technologies, Inc (Teamwork)	3%
Computer Associates (CA-Realia)	3%

BEST DOCUMENTATION	
Micro Focus (Workbench)	54%
KnowledgeWare, Inc (InformationEngineering Workbench)	31%
Intersolv (Excelerator)	10%
Texas Instruments (InformationEngineering Facility (IEF))	7%
Computer Associates (CA-Realia)	3%
Sybase	[illegible]

PREFER TO DO BUSINESS WITH	
Micro Focus (Workbench)	29%
KnowledgeWare, Inc (Information Engineering Workbench)	25%
Texas Instruments (Information Engineering Facility (IEF))	19%
Intersolv (Excelerator)	6%
Computer Associates (CA-Realia)	4%
Computer Associates	[illegible]

PLAN TO BUY	
Micro Focus (Workbench)	50%
KnowledgeWare, Inc (Information Engineering Workbench)	29%
Texas Instruments (Information Engineering Facility (IEF))	16%
Intersolv (Excelerator)	5%
Cadre Technologies, Inc (Teamwork)	4%
Computer Associates	[illegible]

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Not everyone beaming at satellite net project

By Michael Fitzgerald and Ellis Booker

Teledesic Corp.'s $9 billion scheme to ring the globe with a broadband satellite network, announced last week, is the latest in a series of efforts that purport to let businesses communicate in any crevice, cove or cockpit in the world.

Its 10-year time frame and high cost drew a chorus of skepticism from users and analysts, who were not convinced that Teledesic, and big-name backers Bill Gates and Craig McCaw, isn't just Michael Jordan in baseball cleats. But users and analysts said that over time, at least one of these satellite networks will be a success.

"The trend right now is to eradicate phone lines, so eventually with that type of satellite technology you'd eliminate telecom lines altogether," said Justin Alexander, manager of advanced technology at SmithKline Beecham, Inc. in Philadelphia. Alexander said that in Teledesic's favor is its planned use of Asynchronous Transfer Mode (ATM) fast-packet switching in its backbone. This would map to SmithKline's notion of using ATM as a backbone for its complex.

Billionaire Bill Gates *put his own money behind the joint venture*

Still, critics noted major technological, business and regulatory hurdles that Teledesic's 840-satellite network must clear to be operational by 2001. Even some current users of satellite networks were not impressed with Teledesic's grand designs. Target Stores, Inc. in Minneapolis has used the Hughes Corp. satellite network for seven years for data transmissions to stores. But Teledesic sparked little more from system architectural planner Steven Flemming than a grudging concession that "we might have some curiosity" about it.

Dave Beering, staff telecommunications analyst at Amoco Corp. in Chicago, called the Teledesic concept "interesting" but said he will wait to see which projects actually get off the ground. Amoco has an ATM pilot under way.

Fate unknown

Observers noted that all the satellite initiatives under way require huge capital investments and multinational cooperation. While Teledesic is talking the biggest game, other projects, both less costly and less sweeping in scope, could either suffer a dark fate or make Teledesic seem like an afterthought. Four other ventures are already in the works, the most-publicized being Motorola, Inc.'s Iridium network, a $3.4 billion venture that has garnered $1.1 billion in financing in its four years of existence.

However, analysts noted that traditional carriers, cellular carriers, governments and even players such as cable companies are aggressively deploying sophisticated, fiber-optic-based systems, which may greatly reduce the need for satellite-based systems.

Teledesic President Russell Daggatt said demand for broadband services such as telemedicine or videoconferencing already outstrips the abilities of most phone networks. By targeting institutions, not individuals, Teledesic expects to find a market.

The big question is how a company, or consortium of companies, might profit from this type of service. Motorola's tack with Iridium has been to position it as a premium-priced, premium service means of portable communications. Teledesic will target fixed sites and will charge customers roughly what they would pay for land-line services in major urban areas.

Complementary method

John Pemberton, co-founder of the Pemberton Group in Marshfield, Mass., said the proposed Teledesic system would complement, not replace, terrestrial fiber optics.

Even so, several observers noted the complications of obtaining space rights for satellites.

For example, after four years, Motorola's Iridium has yet to obtain a license from the Federal Communications Commission to build its system. A spokesman said it does not expect a license until late 1994 or early 1995.

Despite these obstacles, the influence of McCaw, chairman of McCaw Cellular Communications, Inc., and Gates, chairman of Microsoft Corp., gives Teledesic, a 3-year-old start-up formerly known as Calling Communications Corp., a lot of sway.

"I give a higher probability of success to Craig and Bill pulling this together than to anyone else," said Mark Eppley, chairman and chief executive officer at Traveling Software, Inc. in Bothell, Wash.

Eppley added that the economic model of setting up a worldwide phone company was changing, thanks to technological innovations. "So while it might look like [they're] putting a $5 bet on the Cubs going to the World Series, it's not as wide-eyed as people think."

LAN in space

The proposed Teledesic Network system takes its architectural notions from the Star Wars "brilliant pebbles" space defense program, which called for many interlinked, low-flying satellites.

As such, it will use 840 interlinked low-Earth orbit geostationary satellites — hundreds more than any existing or planned satellite-based communications network.

Teledesic said it does not intend to market the service to end users. Instead, it will make the infrastructure available to local telephone companies and government telecommunications agencies, which will use it to "modernize existing communications systems and bring affordable access to rural and remote locations," the company said.

The meshed network will support channels ranging in speed from 16K bit/sec. to 2.048M bit/sec., as well as a smaller number of 155M bit/sec. and 1.244G byte/sec. channels for special applications.

The network will be based on fast-packet switching using the ATM protocol and will operate in the 30/20 GHz Ka band for fixed satellite service.

Targeted to be in operation by 2001, the satellite network will support 2 million simultaneous, full-duplex 16K bit/sec. connections and cover 95% of the Earth's surface, Teledesic claimed.

— Ellis Booker

Microsoft invests $30M in Mtel

Microsoft took an equity stake in Mobile Telecommunication Technologies Corp. (Mtel) last week. Microsoft invested $30 million in Mtel's Nationwide Wireless Network (NWN), giving it an 8.5% stake in the Jackson, Miss., wireless network vendor. Mtel is best known for its SkyTel paging network. NWN is not scheduled to be operational until late 1995. The funding follows a recent investment by Microsoft in Metricom, Inc., which makes campus-type wireless networks. A Microsoft official said it is working with these types of firms to better understand the market for wireless computing and how to develop software for those areas.

— Michael Fitzgerald

Communications technology in ORBit

Developers working on the Iridium project at Motorola are expected to bring in object-oriented technology to coordinate satellite-to-ground station communications and communications on the ground, according to industry sources.

The Orbix technology from Iona Technologies Ltd. in Dublin is an object request broker (ORB) that complies with the Object Management Group's Common Object Request Broker Architecture (CORBA) and lets communications occur consistently among programs, the sources said.

For example, Orbix will establish a protocol that will allow objects to be shared between satellites and the base station.

Iona officials refused to comment. David Castillo, Motorola's lead software engineer for Iridium's systems control segment, would not give specific product details. He said, however, that "we've looked at a CORBA for our nerve center and are evaluating a number of ORBs, including Iona's. Our software will manage the health and status of the network, and the infrastructure will be CORBA-based."

An announcement about Iridium's use of Iona is expected within the next two weeks, the sources said.

— Melinda-Carol Ballou

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Fruits of labor

The first fruits of Novell's proposed buyout of WordPerfect will be a comprehensive workflow/workgroup offering. It will be pitted against Lotus' Notes and upcoming Lotus Communications Server (LCS), as well as Microsoft's upcoming Enterprise Messaging Server, which is expected this summer.

Novell's GroupWare, which is expected to be officially announced this week, will combine Novell network services with WordPerfect's Office, InForms and SoftSolutions Document Management System, Novell said in a white paper released last week.

BRAIN SHARE

Messaging

The product will offer electronic messaging, calendaring, scheduling, document management, groupware and workflow applications, as well as remote server access, messaging, cellular, fax and paging connections for mobile users. Novell will supply the underlying enterprise services, such as NetWare Directory Services (NDS), as a common global directory for the applications.

The suite will run on Unix, OS/2 and Microsoft's Windows NT servers in addition to NetWare and will support a range of client systems. Open application programming interfaces (API) will be available to third-party developers to tie in their applications. Rollout should begin in approximately one year, a Novell spokesman said.

However, the vendors said they are just starting to hammer out a plan for merging the best of their respective messaging products into a comprehensive messaging engine that will be a piece of their workgroup/workflow architecture.

Linking

Preliminary steps, expected by year's end, will include links between WordPerfect's Office and Novell's NDS and Global Message Handling System.

Also in the works are APIs and AppWare Loadable Modules that will enable developers to hook their applications into a messaging platform that combines Novell's message routing and WordPerfect's message storage system, said Robert Davis, Novell's senior vice president of corporate marketing.

One source said Lotus would be tying its forthcoming LCS into NDS. If true, users would no longer have to maintain separate networking and messaging directories.

—Elisabeth Horwitt

Novell

CONTINUED FROM PAGE 1

"I hope they put together the best of both companies rather than the worst," said Gary Wilkerson, supervisor of end-user services at health care provider Kaiser Permanente in Atlanta.

Despite these concerns, many customers said Novell's vow to deliver bulletproof networked applications sounds promising. They also lauded the idea of consolidated network and desktop application support.

And with WordPerfect's profits slumping because of the popularity of desktop applications from Microsoft Corp. and Lotus Development Corp., some customers said the Novell purchase at least reassures them that WordPerfect's products will be around for a while.

"It could improve WordPerfect's compatibility with Novell [NetWare] and give us one number to call for help," said Ron Stauss, manager of systems development at Rust Engineering Co. in Birmingham, Ala.

What will happen probably will not be clear until June, when the merger is expected to be completed. The agreement detailed last week has Novell acquiring WordPerfect and the Borland spreadsheet. WordPerfect would become a wholly owned subsidiary headed by WordPerfect Chief Executive Officer Ad Rietveld. It would focus on group communications software as well as marketing WordPerfect software and a three-product application suite called Borland Office that Borland markets.

With the merger, several management issues will step to the fore. Given that Rietveld has spent but two months at WordPerfect, and Novell President and CEO Ray Noorda is slated to step down in June, the question of who will head up the combined firm hangs heavy.

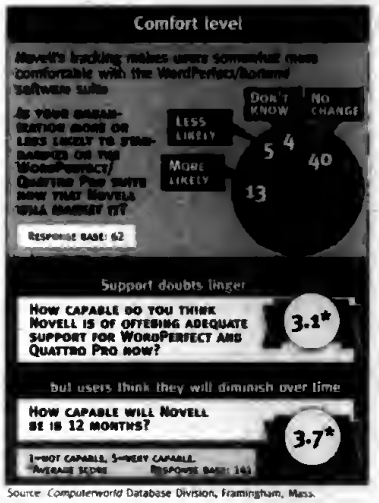
Wall Street, along with some analysts, were at best skeptical about the merger. Many observers suggested Novell overpaid for WordPerfect, which acknowledged it had been in concurrent discussions with Lotus.

"Novell is eating something larger than its head. They are investing in too many companies and not doing enough" with the ones they have, said Heidi Dix, a software strategy analyst at Forrester Research, Inc. in Cambridge, Mass.

Beyond financial issues are concerns about whether they show a real synergy in their product lines.

Novell plans to introduce workgroup and workflow applications within a year that combine its NetWare directory and message-routing strengths with WordPerfect's document processing, message storage and rules-based document routing technology, said John Edwards, Novell executive vice president.

To its credit, Novell now has the raw tools — NetWare services and WordPerfect LAN products — to cobble together a compelling group computing strategy to compete with Lotus and Microsoft, observers said. Specifically, Novell discussed layering its AppWare development software on top of the Borland Office suite.



Source: Computerworld Database Division, Framingham, Mass.

Novell details multiprocessing NetWare vision

By Elisabeth Horwitt
and Jaikumar Vijayan
SALT LAKE CITY

Novell, Inc. last week detailed its long-term strategic vision for NetWare, based on a plan to support multiprocessing. When implemented, the plan should enable NetWare users to better run mission-critical applications in a distributed environment.

Novell's four-phase move to multiprocessing includes the following:

- Symmetrical multiprocessing (SMP) support by year's end for NetWare 4.x.
- Nonsymmetrical multiprocessing-capable NetWare Loadable Modules that will run under SMP NetWare via dedicated central processing units. These will ship in 1995.
- Platform-independent multiprocessing by year-end 1997. Asymmetrical multiprocessing and clustering support-enabled NetWare will be available in this third phase.
- In the final phase, multiprocessing NetWare will be available across processor-independent platforms including those from Hewlett-Packard Co., Sun Microsystems, Inc., Digital Equipment Corp., Compaq Computer Corp., Tricord Systems, Inc. and NetFrame Systems.

Joining together

Concurrently, Novell will move UnixWare and NetWare to the same software microkernel. Novell hopes to combine the best features of the two systems, according to chief scientist Drew Major.

Users said they were pleased with the plan but pointed out that multiprocessing still lacks the essential components needed to be broadly useful.

"What's needed right now are applications that use the technology," said Michael Stonecipher, office systems manager at United Missouri Bank in Kansas City.

Still, some users were unimpressed.

"So far, all the talk about distributed processing in the LAN environment has been just smoke and mirrors," said Marshall Fernbolz, network control manager at the American Medical Association in Chicago. "Vendors have still not been able to get the handshaking accomplished between different product lines."

The move to SMP flies in the face of recent corporate statements that Novell had no serious plans for this technology [CW, Sept. 20, 1993]. Analysts said the announcement, made at last week's Brainshare developer conference, would help Novell make up lost ground in the multiprocessing market.

Greater capacity

The first version of NetWare to support SMP will off-load resource-intensive portions of the operating system to dedicated CPUs. This will give the main CPU more capacity for non-SMP NetWare Loadable Modules and services. These would likely be LAN and disk drives, directory authentication and encryption, according to Novell.

Playing catch-up

"The SMP announcement is Novell's way of catching up to Unix and NT," said Clare Garry, senior analyst at New Science Associates, Inc., a division of Gartner Group, Inc.

Novell also announced the addition of server vendor Tricord as its latest multiprocessing hardware partner.

Tricord will provide expertise and its PowerFrame SMP servers to assist Novell in the development of the SMP-enabled NetWare, according to Mark Garver, Tricord's vice president of corporate strategy.

Novell is beefing up support of CompuServe forums. See page 61.

Microsoft

CONTINUED FROM PAGE 1

memo marked confidential and dated Dec. 31, 1993.

The goal is to establish Object Linking and Embedding (OLE) as the standard for "document-centric" computing. Microsoft intends to freeze oot Novell by combining distributed OLE capabilities with a file system designed to quickly store and retrieve objects in Cairo, a major versioo of Windows NT due out next year.

The memo notes that "Cairo . . . cootains a silver bullet against Noveli, cbanging the game in file serving."

"This means storing OLE embeddings, finding documents, etc., must work dramatically better in our environment than in Novell's," Allchin explaioed in the memo.

While Rich Tong, director of Windows NT marketing in the business systems division, would not confirm the existence of the memo, he said that the basic strategy is not a secret.

Microsoft plans for NT and the server applications to account for $1.5 billion in sales by fiscal 1998, up from $100 million to $200 million in fiscal 1993, according to the memo.

"Over time, we will be lowering NT's price, and (sooner rather than later) we will be raising NT [Advanced Server's] price" for larger environments, tbe memo states. Tong said NT is "definitely on a penetration pricing scheme."

Daytona will deliver

Meanwhile, the first major salvo in the object battle will come next quarter when Microsoft ships Daytona, an interim update of Windows NT and NT Advanced Server.

Daytona will require less memory, run faster and supply better support for other networks such as Noveli's NetWare and TCP/IP.

"Customers already have installed systems. Immediately adding value to this environment makes us the perfect Trojan horse," the memo states.

But making NT ubiquitous while also reaping huge profits will be tricky: Microsoft will have to reassure its customers that the move will be smooth. If users wait until Cairo arrives, the change may be too abrupt to tempt them over the brink.

Acquisitions smell of suite success

By Ed Scannell
and Lynda Radosevich

The rapid pace of coosolidation among PC software companies will fuel the drive toward suite sales and may push users to form groups to more effectively lobby for their interests.

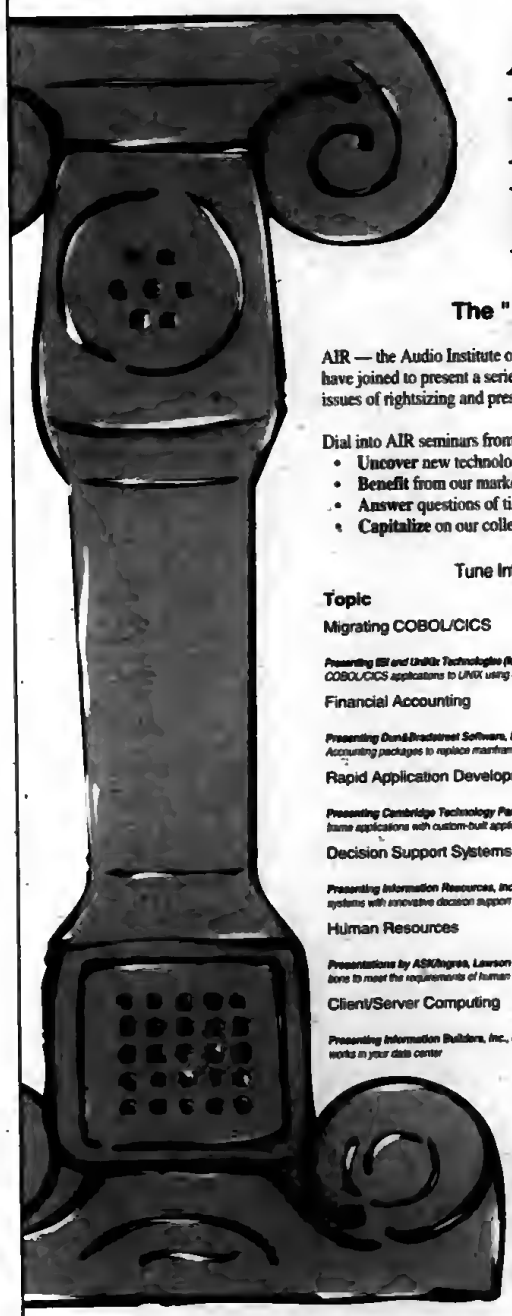
Novell, Inc.'s acquisition last week of WordPerfect Corp.'s and Borland International, Inc.'s spreadsheet businesses is just the latest example of bow tbe microcomputer software business is becoming a caste society made up of billion-dollar superpowers and cottage-industry-size developers.

The upshot is that users will bave fewer — albeit more integrated — packages from which to choose.

"User groups already are becoming more powerful and will become more so to make sure that the products we invest time and money in remain viable and aren't pushed out of the marketplace by mergers or battles between software giants," said Frank DeVito, manager of information systems at Rogers & Wells, a large New York law firm.

The greatly reduced purchase price of suites "probably will force our hands," agreed Eddie Whinecoff, manager of systems programming at Doran Textile, Inc. in Shelby, N.C. "If you can get all of [the applications] for tbe same price [as one], well, price is usually our first criteria."

However, analysts said customers should also realize it will be at least a year before Noveli becomes a viable competitor to Microsoft Corp. and Lotus Development Corp. in tbe desktop applicatiob and groupware areas.



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News Shorts

Compaq to include Stacker 4.0

Stac Electronics last week said **Compaq Computer Corp.** will ship its Stacker 4.0 disk compression utility preinstalled on Compaq desktop and portable computers. Compaq currently has the version of Stacker 4.0 that contains the DOS preload feature that was the subject of a successful Microsoft theft-of-trade-secrets verdict against Stac last month. However, the computer manufacturer said it also has a "nonpreload" version that it can ship if Microsoft gains an injunction to halt shipment of the preloading code.

Sun to complete overhaul

Sun Microsystems, Inc. is expected to complete a makeover of its workstation line this week with the unveiling of low-end and midrange workstations. The SPARCstation 5, based on 70-MHz and 85-MHz versions of MicroSPARC II chips from **Fujitsu Ltd.**, will be priced from $3,995 and $11,395. The new models are to replace older SPARCstation LX machines as Sun reprices its entry-level SPARCclassic machine at $2,995. The new SPARCstation 20, based on SuperSPARC chips running at 50 MHz and 60 MHz, is priced from $12,195, Sun said.

AIX 4.0 to support multiprocessing

The next release of **IBM's** AIX operating system will be tailored for IBM's new symmetrical multiprocessing (SMP) Unix machines, due out by summer [CW, Feb. 7]. AIX 4.0 will support multithreaded database applications running on the SMP machines. In the future, it will be tuned to fit desktop PC clients, departmental servers and enterprise servers, said Donna Van Fleet, director of RISC systems software at IBM's RISC System/6000 division. Pricing will be scaled to the processor. AIX 4.0 will also do Windows, using Sun's revamped Wabi interface (see story page 4).

JC Penney chief wins award

JC Penney Chairman William R. Howell will receive this year's "Excellence in Technology" award from **Gartner Group, Inc.** Gartner cited the retail and catalog giant for its use of electronic data interchange (EDI) to boost sales and reduce general and administrative expenses from 30.6% of sales to 28.6%. EDI is used for more than 96% of the company's purchase orders and 84% of its invoices. It also enables JC Penney to provide 1,300 suppliers with a weekly summary of their sales from the previous week.

EDS, Bull aid Bosnian refugees

Electronic Data Systems Corp. and **Bull HN Information Systems, Inc.** have joined technology forces to assist the **United Nations** in reuniting Bosnian refugee children with their parents. Under Operation reUNite, EDS is creating a database of refugee profiles supplied by the UN, including photographs. EDS transfers the data to CD-ROMs, which it distributes to UN officials who use Bull portable and desktop boxes at various refugee sites.

SHORT TAKES **Banyan Systems, Inc.** announced that co-founder Lawrence Floryan is leaving the company to start a high-technology venture.... **Microsoft Corp.** said it will license Windows source code to **Locus Computing Corp.** and **MainSoft Corp.** so the two can support Windows applications on popular Unix systems.... **Computerland Corp.** changed its name to **Vanstar, Inc.** following its $110 million sale of the Computerland name, franchise and distribution division to **Merisel, Inc.**... **Hewlett-Packard Co.** is expected to announce a $40,000 high-performance version of its HP 9000 Model 735 workstation this week.

Sybase products remain disjointed

By Kim S. Nash

■ Sybase, Inc. quietly sent beta copies of its first graphical development tool, Build Momentum, to at least two large customers last month. Meanwhile, ship dates and features remain vague for a repository needed to unite Sybase's disparate application development tools even though the company outlined plans for it seven months ago.

Though details were scant at the time, a repository is key to fully integrating the products because it would serve as a weigh station of sorts for new and existing applications created with it.

However, in its first release, due out early next year, the repository will not integrate Sybase's tool collection, said Bill Smith, senior product marketing manager for Enterprise Momentum.

"In August, we [showed] a diagram that laid out the completed vision for Enterprise, integrating Gain and Build applications, but that's not for a while yet," Smith said. Enterprise 1.0 will contain various data and business process modeling tools only, he said.

Sybase's so-called Momentum strategy, a banner under which old and new graphical and character-based development tools would be integrated, consists of the following:

- Gain Momentum, a multimedia kit acquired from Gain Technology, Inc. 18 months ago.
- Build Momentum, a graphical tool set for building Windows-based software and converting character-based programs built with APT Workbench.
- Enterprise Momentum, a set of data and process modelers to be managed by an overarching repository that would unite all Sybase tools.

> Traditional CASE vendors, including Bachman Information Systems, Inc. and LBMS, Inc., are helping Sybase build links from its repository to their CASE tools, a Sybase official said.

Need for direction

Sybase must address the lack of a repository soon, said Herb Edelstein, an analyst at Euclid Associates in Potomac, Md. "Otherwise, users will have a hard time understanding what to do with all those tools and how they fit together."

Still, Sybase's efforts may not overcome a problem endemic to many repositories, Edelstein said, noting that they tend to be vendor-specific. "That can be limiting if people think moving to client/server means freedom from homogeneity."

Meanwhile, Build Momentum — Sybase's answer to Powersoft Corp.'s PowerBuilder client/server tool kit — is in use at Avalon Software, Inc. and Hill Arts & Entertainment, Inc. The software makers sell programs written in character-based APT Workbench. With significant installed bases in Sybase, both firms want to put graphical interfaces on their applications.

But until Build Momentum is stable, Avalon will not ship applications written with it, said Doug Souza, head of development. "It's been a slow process, but we're getting there," he said. Avalon expects to have graphical Sybase packages out next quarter.

Vendors address need for Notes tools

Firms line up to offer support

By Melinda-Carol Ballou

Lotus Development Corp.'s Notes has become a hot environment for development tools makers, as evidenced by several products due to hit the streets in the coming months.

While Powersoft, Inc. will ship its PowerBuilder Library for Notes by mid-April, several other companies have or will have products that offer Notes links to IBM's SQL along with a range of development tools.

Those companies include Brainstorm Technologies, Inc. in Cambridge, Mass., [CW, Nov. 1, 1993] and Edge Research, Inc. in Portsmouth, N.H.

Notes users need support from tools vendors because current options for Notes development are cumbersome and Lotus has not yet shipped its supposed solution to that problem, Notes VIP tools.

The PowerBuilder Library for Notes lets developers connect SQL data with Notes and incorporate Notes data directly into PowerBuilder applications, according to Bill Critch, Powersoft's director of business and alliance programs. Announced at Lotusphere last December, the product was originally slated to ship by the end of the first quarter [CW, Dec. 12, 1993].

Power play

The PowerBuilder Library is customized for PowerBuilder and lets developers automatically generate PowerBuilder objects out of Notes forms and data. Those objects can then act as templates for creating PowerBuilder applications, Critch said.

The Brainstorm and Edge Research products, on the other hand, generically support a range of tools, including Microsoft Corp.'s Visual Basic and Gupta Corp.'s SQL Windows.

Both companies use Visual Basic controls, also known as VBXes, to support Notes. Brainstorm's primary product is Visual Basic/Link to Lotus Notes. The company also created Dynamic Link Libraries (DLL) for Gupta's SQL Windows, which in turn can make calls to Notes DLLs to let developers easily connect the environments, according to company officials.

> **Unique fact**
>
> Edge Research will take an unusual approach to distribution; shipping its product for linking Lotus Notes to Visual Basic on CompuServe and WorldCom. While the initial three copies will be free of charge, a probable pricing scheme is $20 per copy thereafter, with an initial minimum of 100 copies and a support charge of $500 per user.

Basic addition

Brainstorm currently offers support for PowerBuilder as well; Edge Research will ship its product for Visual Basic next month and is expected to provide PowerBuilder support by the summer.

In addition to the VBX controls, Edge Research has built a new application programming interface for Notes that lets developers create C calls to Notes from Visual Basic.

Separately, Gupta officials said they will ship their own support for Notes by the summer with a new version of their SQL Windows tools.

PowerBuilder Library for Lotus Notes is priced at $295 for use in conjunction with Enterprise PowerBuilder, which is priced at $3,395, or with PowerBuilder Desktop, which will be priced at $695 starting next month.

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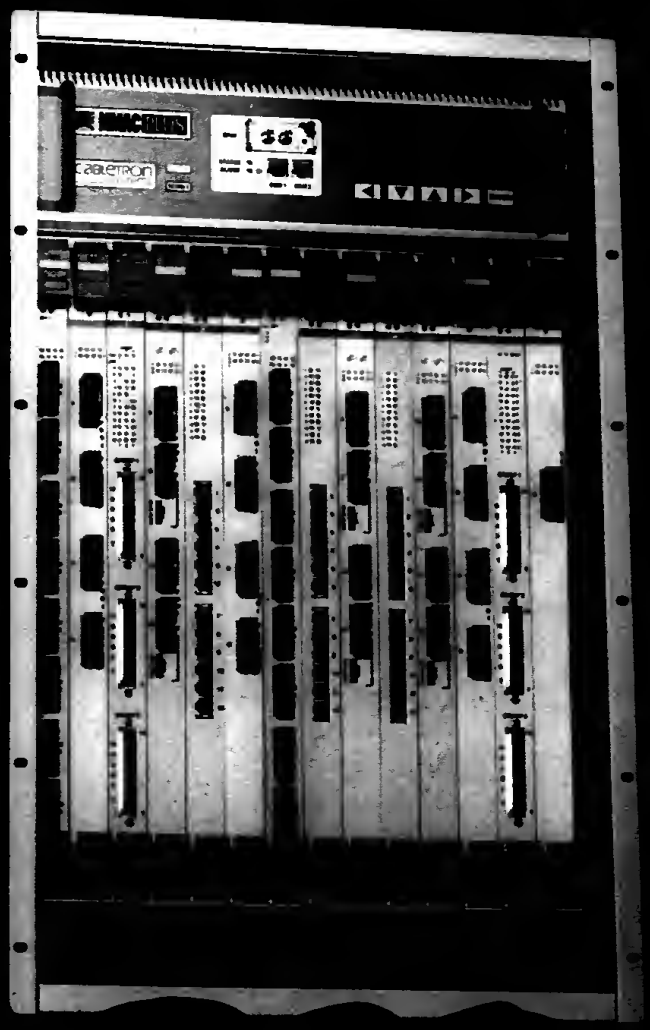

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IBM continues shift to Ethernet

By Stephen P. Klett Jr.

IBM quietly unveiled its first Ethernet switch last week as part of a networking product rollout consisting mostly of Token Ring hardware (see page 47). Observers said the switch was a harbinger of bigger Ethernet rollouts as IBM continues to shift its focus away from a shrinking Token Ring market.

Analysts said IBM's Token Ring strategy hurt the company by delaying its development of more cost-effective products — such as the Ethernet switch — that alleviate bandwidth congestion in shared LAN environments. The switch will be followed by another round of "more glamorous" Ethernet products in a month or two, according to Tom Nolle, president of consultancy CIMI Corp. in Voorhees, N.J.

IBM's focus on Ethernet does not appear to be a big issue for some large Token Ring sites.

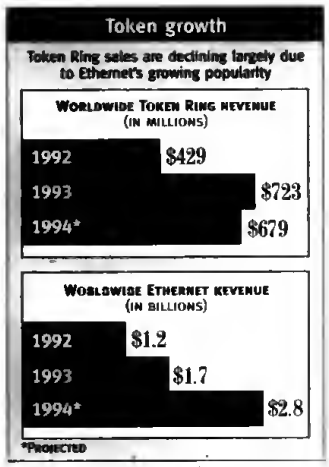
"Long-term Token Ring support is really not an issue unless someone plans to just follow Token Ring as their only networking architecture, which would be misguided," said Bill Conley, manager of corporate information systems at Loral Aerospace Corp. in Newport Beach, Calif.

He said that if he were starting from scratch, he would buy Ethernet because it is the less expensive route.

In fact, price is becoming a major horn in Token Ring's side. For example, network adapter cards can cost anywhere from $200 to $600 more than their Ethernet counterparts. Higher-speed products such as switching hubs and full-duplex adapters also cost two to three times more than comparable Ethernet products. Token Ring's claim to fame has been built-in intelligence and manageability, for which large customers had been willing to pay a premium.

No longer.

Recent research shows that the Token Ring market has experienced two straight quarters of decline, which is expected to continue throughout this year (see chart), while Ethernet is experiencing phenomenal growth. According to analysts and users, more and more remote sites are bringing in Ethernet to integrate their SNA and corporate LANs because Token Ring's prices are too high.



Source: Dataquest, Inc., San Jose, Calif.

Users also said Ethernet is better-suited for certain applications.

The low-end Ethernet switch fills out IBM's Ethernet product line, which now runs the gamut from adapter cards and hubs to management software.

Next on IBM's non-Token Ring product schedule are Ethernet switches that support XT/AT bus, Extended Industry Standard Architecture and PCMCIA-based PCs — the current switch supports only IBM's MicroChannel Architecture — and 10/100M bit/sec. adapter cards, according to Laura Knapp, senior technical adviser for IBM networking systems in New York. Future switches will include support for high-speed networking technologies such as 100M bit/sec. Ethernet and 100VG-AnyLAN, she said.

However, Knapp said IBM will not forget about Token Ring and that users can expect to see Token Ring adapter cards and switches supporting full-duplex data transmission by year's end.

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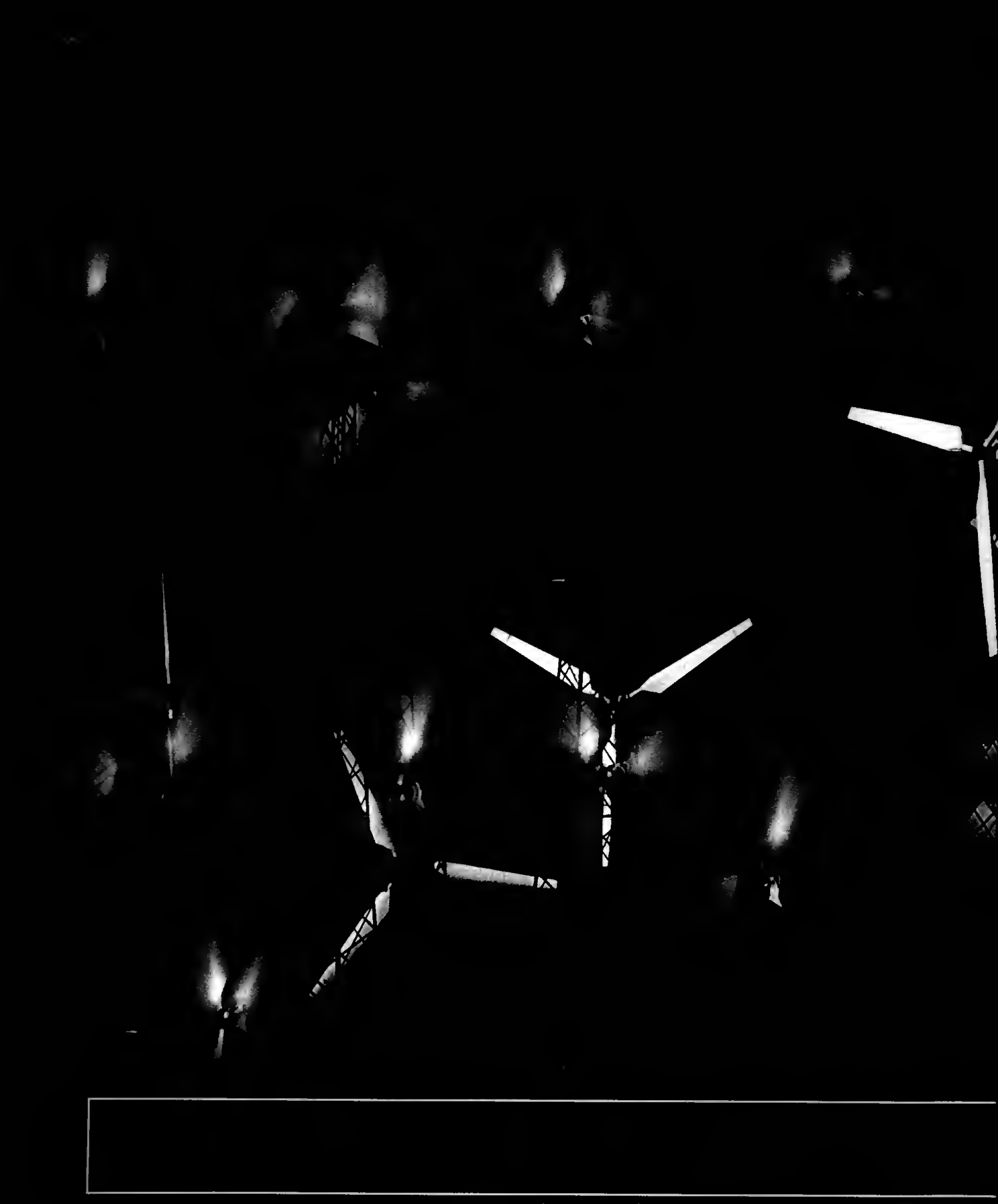

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digital

NextStep port to DEC OSF/1 on way

By Kim S. Nash

Next Computer, Inc. last week announced a deal with Digital Equipment Corp. to port part of the NextStep object-oriented development environment to the DEC OSF/1 operating system by summer.

Next's so-called Portable Distributed Objects (PDO) kit is a server-based object model and messaging architecture drawn from parts of NextStep. In broad strokes, Next's distributed object framework was built to let objects send and receive messages regardless of whether they reside in the same application or on the same computer. Further, with PDO the objects can live on operating systems other than NextStep, which is based on Intel Corp. processors.

With PDO on DEC OSF/1 and other non-Next operating systems, users have a choice of server, said Matt Peron, officer at The First National Bank of Chicago. The bank is not limited to Intel-based machines and can select the fastest hardware and operating system available for its object-oriented applications, which often require more processing power than traditional software, he said.

PDO for Digital servers is due out by June, when Next is expected to release Version 2.0 of the product, said Steve Jobs, Next president and chief executive officer.

But the Digital edition is not expected to ship until after a similar product for Sun Microsystems, Inc.'s Solaris and SunOS operating systems. Those versions are due out in late April or early May, Jobs said. PDO for Hewlett-Packard Co.'s HP/UX has been available since late last year.

Standard price

PDO pricing is the same on Digital, HP and Sun platforms, according to Next's Steve Jobs: $2,500 for a small server version, $5,000 for a medium-size server version and $10,000 for a large server version.

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Computervision signs Rolls-Royce megadeal

By Jaikumar Vijayan

Computervision Corp. has clinched a $21.4 million deal with Rolls-Royce Aerospace Group in what represents the vendor's largest single contract for software and services.

The initial order is for 1,000 seats of Computervision's Computer-Aided Design and Drafting System (CADDS) 5 and Engineering Data Management products. Rolls-Royce, based in the UK, has the option of buying another 1,000 seats by the end of the decade — lifting the potential value of the contract to nearly $60 million over seven years, according to a spokesperson for Bedford, Mass.-based Computervision.

The aero engine group of Rolls-Royce will use the software to electronically design the more than 18,000 components of a modern jet engine. The software will help engineers "build" and test jet engines before metal or composites are even cut.

The process, called Electronic Product Definition (EPD), is expected to save Rolls-Royce several million dollars in physical models, according to Garreth Evans, Computervision's vice president in charge of the Rolls-Royce account.

"The real benefit, though, is that the time spent in developing aero engines is going to be drastically reduced," Evans said. He said EPD will cut product development time for a new jet engine — typically six to eight years from design to manufacture — in half.

Rolls-Royce and Computervision have worked together since 1979 to develop a computer-aided design and manufacturing process for the aero engine manufacturer, according to a Rolls-Royce spokesperson. The Rolls-Royce Trent aero engines that power Boeing 777 and Airbus A330 aircraft were designed with Computervision software.

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THREE CITIES. FIVE BUILDINGS. JUST WHAT THE H

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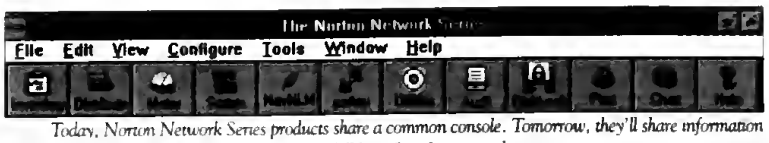

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*Symantec, Norton Administrator for Networks, Norton AntiVirus, pcAnywhere, Norton DiskLock Administrator Norton Utilities

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Internet panel finds reusable passwords a threat

By Gary H. Anthes
WASHINGTON

A panel of experts disagreed last week on how savvy users really are about network security. But on one point they were unanimous — the time has come to end the use of reusable passwords.

Testifying before a congressional committee probing a rash of Internet intrusions facilitated by "password sniffing," the panel said users should move to one of the advanced techniques in which passwords are used only once, are sent encrypted over networks or both.

On Feb. 3, the Computer Emergency Response Team (CERT) at Carnegie Mellon University in Pittsburgh sent an alert over the Internet warning millions of users of a dramatic increase in illegal network monitoring. This involves intruders gaining privileged access to a computer and installing "sniffer" software to monitor the system's network interface port and collect log-in information, including passwords [CW, Feb. 7].

"The Feb. 3 alert signaled the end of reusable passwords as a reliable means of security," said L. Dain Gary, manager of the CERT Coordination Center, in a speech to the House Science subcommittee.

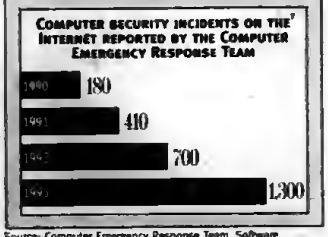
"Traditional user authentication by means of reusable passwords does not provide strong security in today's networked environment — with or without encryption," testified F. Lynn McNulty, associate director for computer security at the National Institute of Standards and Technology. Internet hosts protected by "advanced methods such as tokens or smart cards" were not at risk, he said.

"Let me emphasize that this threat is not limited to the Internet," said Stephen D. Crocker, a vice president at Trusted Information Systems, Inc. in Glenwood, Md. "The same threat exists in every local-area network."

Nevertheless, Thomas T. Kubic, chief of the Federal Bureau of Investigation's Financial Crimes Section, testified that in more than 80% of the FBI's computer crimes investigations, the internet was used to gain illegal access to systems.

Insecurity

As the size of the Internet mushrooms, so does the number of computer security breaches



Source: Computer Emergency Response Team, Software Engineering Institute, Carnegie Mellon University, Pittsburgh

New technologies on the way

Vinton G. Cerf, president of the Internet Society and senior vice president for data architecture at MCI Communications Corp., said users are aware of the risks and payoffs of internet use. However, he said some 30,000 Internet Protocol networks — one half of all IP networks — could be attached to the internet but are not, largely because their owners are worried about security.

Cerf said technologies are emerging that will enable information on internal networks to be partitioned between what is to be made publicly available and what is to be held confidential.

Gary said users are partly to blame for products without security features. "Systems should be configured for security prior to being shipped," he said. "But now, demand is for products that work, for performance, low cost and interoperability. Security is not being asked for."

Several panelists assailed government export control policies that bar export of software with the most popular encryption techniques.

A smart card-based security system generates use-once passwords. See page 51.

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Sun targets enterprise server sales

By Jean S. Bozman

When Sun Microsystems, Inc. sat down with the rest of the Unix community last week to join a revamped Open Software Foundation (OSF), it demonstrated a new and determined pragmatism designed to boost profits at the $4.3 billion company.

While sales of Unix workstations are still growing and constitute about three-fourths of all revenue, profit margins have shrunk during the past two years due to the "commodity" pricing of low-end machines from rivals Hewlett-Packard Co. and Silicon Graphics, Inc. Now, Sun is placing new emphasis on building up sales of its large-scale Unix servers to corporate enterprises.

Ed Zander, *SunSoft president: 'If Sun is going to be a $10 billion entity by the end of the decade, we have to find more users for our technologies'*

The SPARCserver 1000 and SPARCcenter 2000, shipping since May and June, respectively, already generate nearly 20% of Sun's sales, but with higher profits. At the same time, Sun is pushing harder to make its Solaris operating system a standard "brand" designed to encourage application development by third-party independent software vendors [CW, March 21].

Earlier this month, Sun revamped its bread-and-butter workstation lines with faster chips and new packaging and added a high-end redundant arrays of inexpensive disks subsystem for backup and recovery of large relational databases hosted on Sun servers.

Cultural shifting

Sun's server and software initiatives will be showcased here next week during an Enterprise Summit — dubbed the "Big Bang" by Sun in typical tongue-in-cheek style — that coincides with the SunSoft, Inc. developer's conference.

Along with the shift from workstations to servers comes a subtle change in corporate culture, top Sun executives said last week. "We are still religious about open interfaces and barrier-free interfaces," said Chief Executive Officer Scott McNealy. "But we're a little more empathetic to customers' legacy systems issues. We're very sympathetic since we have our own mainframe environment."

Sun outsourced its mainframe applications, which handle 10% of the information technology work load, to Computer Sciences Corp. The mainframe applications will run until Sun installs Oracle Financials Release 10, which is not shipping yet, on Sun servers, said Sun Chief Information Officer Bill Raduchel.

Nothing less than a change in corporate culture is required for moving into the role of enterprise server provider, said Sun Microsystems Computer Corp.'s new president, J. Phillip Samper. Such a change requires attention to the complex integration needs of large information systems sites (see story below), although Sun is prepared to refer its customers to outside systems integrators such as Andersen Consulting and Electronic Data Systems Corp.

Scott McNealy, *Sun CEO: 'We're a little more empathetic to customers' legacy systems issues'*

No time for ego

"I think we have to understand the needs of the customer much more than we have in the past," said Samper, a former Eastman Kodak Co. executive and Sun board member. Sun can hardly afford to rest on its laurels, he said. "There is always the fear that with size comes arrogance. But the leader of today can lose that position in no time."

Raduchel said Sun is evaluating which of its own 300 on-line applications, such as network-based expense accounting and software management utilities, can be turned into products. This will enable the vendor to use its own IS experiences as a template for enterprise Unix applications and services.

In the Sun user base, there has already been some erosion among traditional customers in the scientific and engineering community. They are resisting the conversion from older SunOS/Solaris 1 operating systems to Solaris 2, which is based on a different Unix variant. Scientists were the first to exploit all the Unix extensions in SunOS, requiring them to rewrite custom applications from scratch, rather than installing Solaris 2 versions of commercial Unix packages.

Key Sun user sites also noted that Sun's hardware is no longer enough to sway a sure sale, time after time.

"When you're the leader, you can make the rules as you go," said Jerry McEachern, manager of technology resources at the *Houston Chronicle*. "But when you're not, you've got to work with other vendors, you've got to work with your users and make their life easier. Otherwise, they're going to go down the road to the next vendor."

But some users said Sun is more interested in selling its own hardware platforms and Solaris operating system than coping with the complexities of most IS architectures. "Sun comes across as more interested in getting in the door than in selling in the enterprise," said Rich Cromie, a senior systems analyst at Pacific Bell's San Diego site. "They didn't come in, like HP did, and ask about my business needs. They asked what could they do to make this sale."

Changing the name of the game

Cromie, who counts himself as a Sun supporter, emphasized that Pacific Bell relies on hundreds of Sun machines outside the data center. To cross into the data center, Sun needs to "show how they can help the business," he said. "They need to go in as a consultant first and a hardware provider second."

Sun's willingness to change the game for the sake of growth is clear to many analysts. "There have been a number of moves in the last two years that I would characterize as indicative of increasing pragmatism," said Jeffry Canin, a research analyst at Salomon Brothers, Inc. in San Francisco.

Some examples of that pragmatism include adoption of the OSF/Motif user interface, reversal of a long-held stance against selling X Window System terminals and the year-old Common Open Software Environment partnership with IBM, HP and other Unix vendors, which last week became part of a restructured OSF (see page 4).

Sun was able to avoid losses under competitive pricing pressure due to its unique subsidiary business model, which devotes development resources to dedicated business units. "Profits have been up and down at Sun," noted Scott Winkler, a program director at Gartner Group, Inc.'s software management strategies service. "But you have to give them credit — they are profitable, and they're still growing."

Sun Microsystems, Inc.

Sun saw a decline in its income for fiscal year 1993 because of pricing and fierce competition on the low-end side of the workstation market

Net revenue	
Q2 1994	$1.1B
Q1 1994	$960M
FY 1993	$4.3B
FY 1992	$3.6B

Net income	
Q2 1994	$44M
Q1 1994	$17M
FY 1993	$157M
FY 1992	$173M

Sun costs push users to NT clients

Many commercial sites like their Sun servers but are concerned about climbing costs. At the Alberta Cancer Research Board in Edmonton, Alberta, ownership of 100 Sun machines — including a dozen SPARC 10 servers — has not prevented the growth of Windows clients and experimentation with Microsoft Corp.'s Windows NT-based servers.

"Sun is no longer the price/performance leader on the desktop, and increasingly we are growing Windows clients," said Felix Fridman, director of IS at the $60 million not-for-profit health agency. Another concern, he added, was that Sun nearly doubled the site's Solaris licensing fees with a new processor-based pricing schedule.

But many Sun users are confident that their Sun servers are a cost-effective alternative to mainframes and aging minicomputers. In 1990, Dunkin' Donuts, Inc. in Randolph, Mass., replaced an aging Burroughs Corp. mainframe and most software from a Wang Laboratories, Inc. computer with two Sun 690 servers and an Oracle Corp. database. Oracle's Financials packaged software suite will be installed to replace the old Wang software.

Dave Bennett, Dunkin' Donuts' IS director, said users will benefit when Sun cooperates more closely with other Unix vendors. "While they always feel they may have the better piece of technology," he said, Sun has always maintained "It's not whether you're first to market, it's whether you're first to volume [shipments] that's important. They've got to listen to their own words."—*Jean S. Bozman*

The Apple Report On PowerPC

NUMBER 3 – APPLICATIONS ACCELERATED FOR POWER MACINTOSH

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But the real benefit of the new Power Macintosh computers can be seen with new applications that take advantage of the PowerPC chip's advanced capabilities.

These applications, often called native applications, will offer two to four times the performance of programs available for the fastest Macintosh computers today.

Developers writing native applications also report that these applications perform at levels better than their Windows counterparts running on Intel Pentium system–based computers.

Major developers on board.

Right now, the world's leading developers are updating their most popular and memory-intensive programs to take full advantage of Power Macintosh computers.

In fact, Apple has been working closely with more than 200 major third-party developers since 1992 to create powerful new versions of their applications.

And since software development kits became widely available in January, hundreds of additional developers have begun the move to Power Macintosh computers.

PowerPC technology enables them to build unprecedented speed and functionality into applications for the Macintosh system. Developers everywhere are eager to exploit these new capabilities.

What about software?

A Power Macintosh will run virtually all of your existing Macintosh system–based programs. The real benefit of a Macintosh with PowerPC technology, however, is with applications optimized to take advantage of the new chip's advanced capabilities. Here are some of the native applications that are available now or will be out in the next few months:

ACI 4th Dimension	*Frame FrameMaker*
Adobe Dimensions	*Insignia Solutions SoftWindows*
Adobe Illustrator	*Microsoft Excel*
Adobe Photoshop	*Microsoft Word*
Adobe Premiere	*Specular Infini-D*
Aldus FreeHand	*Strata StudioPro*
Aldus PageMaker	*VideoFusion VideoFusion*
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Claris ClarisWorks	*Wolfram Mathematica*
Fractal Design Painter	*WordPerfect WordPerfect*

Do more in less time.

What do the advanced capabilities of native applications mean to you? You'll spend significantly less time waiting for your computer to redraw or recalculate or re-anything. That means you'll have more time to create and refine your work, to apply new concepts, to test options.

You can also expect to see new kinds of applications—software that is both more intelligent and easier to use.

Developers will be exploring new features in areas such as intelligent help, 3-D design, video, animation, speech recognition and text-to-speech conversion.

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Dear Mr. Noorda

Call it off, Ray. While you still can.

Novell's $1.4 billion acquisition of WordPerfect and $145 million purchase of Borland's Quattro Pro just don't make sense. You're paying too much for too little. You're confusing your customers and your stockholders. And you may be about to tear down what you've built so carefully in your 10 years as Novell's chairman.

Novell is a great company, Ray. You've got market share that some communist dictatorships would envy. Your customers love you. Heck, most of your competitors love you. Your hammerlock on the network operating systems market is just about untouchable. The entire industry looks to you for leadership.

But recently Novell has become something different. You've begun to believe your colleagues who say you're the only hope against big, bad Microsoft. You've taken on the role of catcher in the rye to the computer industry, saving wayward children who wander off the cliff. But what is it getting you? DR-DOS is going nowhere on the desktop. Your foray into Unix hasn't brought any more unity to that chaotic market. In a business climate in which focus is everything, you're losing your focus entirely.

Look at what you're getting for more than $1.5 billion: A word processor that's the leader in a dying DOS market, a Windows word processor that's so big and slow that almost no one can use it, an E-mail package that's good but ranks a distant third in its market, a presentation graphics package that's an asterisk on the charts and a spreadsheet whose kick-butt features don't matter much in a market that's become as much a commodity as aspirin.

You're buying a WordPerfect user base that's mad about having to pay for support, and you're picking up two-thirds of a software suite. When you should be busy over the next few months shoring up the suite, you're going to be distracted by managing the layoffs that WordPerfect has already announced and cleaning up the organizational mess over there. Meanwhile, you're already late getting NetWare 4.1 out the door.

Your customers and investors are worried. You have committed to stepping down in June and there's no clear line of succession. Whoever takes over Novell is going to inherit a massive integration task while also coping with the political struggles that a change of leadership invariably creates.

The computer industry doesn't need another Microsoft, Ray. What it needs is good, aggressive competition in each of Microsoft's core markets. Between you and Lotus, it was getting that. Now, Novell is going to be sidetracked by a whole host of issues unrelated to its business. I'll bet the two happiest guys in the PC industry last week were Philippe Kahn, who removed an albatross from his neck, and Bill Gates.

Call off the deal, Ray. This isn't what you want to be remembered for.

Paul Gillin, *Editor*

Game over

Regarding "Distributed game of doom may cause LANs to crash" [CW, Feb. 21]: Why would any LAN environment — especially in a business — allow any game program onto a computer in the first place? Granted, for a first-time PC user (yes, my company still has many non-PC users) the simple game of solitaire is a great learning tool for the mouse, but beyond that games are a nonproductive use of company resources.

I find the last point in the article about collaborative network-based computing to be valid, but must it be a game that provides the solution to a LAN overloaded due to broadcast storms?

Oh, I like playing games — but at home on my own computer.

D. D. Pratt
Des Moines, Iowa

A technological entitlement?

In "Deluge of opinions on the information highway" [CW, Feb. 28], Esther Dyson notes that a lot of the people who E-mailed her about the development of the Internet think universal access is good, "but most realized that it shouldn't be free." If it must be subsidized, Ms. Dyson writes, "needy users should be subsidized directly ... so that most users pay its true costs and don't waste it." OK.

In the early 1950s, when TV was new, a family had to be fairly comfortable financially to afford one. The same went for the automobile before about 1920 and the telephone in the 1880s. In the 1990s, you can find welfare families living in demonstrable poverty, but they might also have color TVs and a VCR. They don't have computers yet, but if this technology follows the preestablished path, someday they will.

Doug Johnson
Austin, Texas

Banyan's ENS is a plus for HP

We would like to add clarification to "Banyan ENS extends HP/UX's reach" [CW, Jan. 31] to ensure recognition that Hewlett-Packard views Banyan's ENS product for HP/UX as an important addition for our customers looking to integrate their HP/UX systems into an enterprise network.

The article correctly states that HP's directory strategy is based on X.500 and DCE. This by no means diminishes the importance of our relationship with Banyan or our desire to have ENS on our HP/UX servers. ENS is positioned as a crucial enterprise-level network connectivity solution for HP/UX servers.

HP's strategy focuses on support of network environments that our customers need and currently use, including ENS, Novell's NetWare and LAN Manager for Unix. It is extremely important to provide our customers with support and interoperability for their strategic network environments, including ENS, and we believe that ENS will be a strong choice for integrating HP 9000-based client/server resources worldwide.

We are excited about being able to support ENS on HP/UX and feel this is a very significant addition to HP's set of distributed computing solutions.

Nick Ordon
Hewlett-Packard Co.
General Systems Division
Cupertino, Calif.

Chicago will have to earn its way

John Gantz's column "Chicago: Will users buy into Microsoft's plans?" [CW, March 7] could have emerged from Microsoft's public relations department. If you ask buyers whether they will actually buy Chicago, they will want to know features, performance and pricing — exactly the factors that shot down Windows NT in the mass market.

Gantz has it backward when he claims that Chicago will happen because Microsoft has too much riding on it. The only way Chicago will happen is if it offers a substantial advantage over Windows at a reasonable cost, the way Windows did over DOS.

Douglas Weinfield
Washington

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The mainframe is dead, but so is the PC

Marc Dodge

Current revisionist theory says the mainframe is not dead after all. This is a safe bet — we've been shoveling dirt on it for almost a decade. On the other end of the spectrum, the PC hasn't turned out the way we expected it to, either.

In reality, both platforms are racing toward each other and will collide somewhere between the current functions of both. The mutant won't look anything like a mainframe or a PC. This architectural confusion is great fodder for journalists and industry clairvoyants. Everybody ends up being right at least some of the time. Moore's Law says that computing speeds and chip densities double every 18 months. This pearl of an observation has held for more than a century, starting when card-based computing technology was used for the 1890 census.

Recently, I heard Ray Kurzweil (of scanner engineering fame) give a keynote address. He predicted that Moore's Law will hold into the next century. By 2020, a standard PC will have the speed and memory capacity of the human brain.

Jeez! It was just a decade ago that *Time* magazine speculated that the human brain was so complicated that we might never understand its inner workings. Moore's Law makes it clear that we need to fire up our synapses and rethink what makes a box a mainframe or a PC.

As processors have decreased in size, computers have gotten smaller. In data centers, mainframe CPU floor space has been reduced dramatically. However, disk drives have more than gobbled up the extra space. Microprocessors will power the mainframe of tomorrow, but the box will remain in the glass house supporting these forms of disk drives.

The PC and the mainframe are racing toward a collision with each other.

Yes, the PC and mainframe architectures are colliding in form. Functionally, however, they will remain separate, at least until we solve client/server problems. Client/server computing promises to move more work to the PC processor. Today, client/server is saddled with the mainframe. Why? One problem is distributed database software. It has evolved slowly during the past decade — too slowly. Distributed backup, security and systems management compound the problem.

Like it or not, corporatewide data will remain centralized for the rest of this decade. Architecturally, the mainframe is looking more like a PC. Functionally, it is going to remain a mainframe.

Vendor midrange strategies also follow this architectural convergence. IBM is considering resuscitating the System/36 midrange with a PowerPC microprocessor. The last System/36 hardware introduction was in 1988. IBM also plans to supercharge the AS/400 with a PowerPC microprocessor in 1995. Such midrange strategies remind me of Samuel Johnson's great line about second marriages: "They represent the triumph of hope over experience."

The PC and mainframe species are evolving from different directions into a homogeneous animal. The PC is gaining mainframe-like power, and the mainframe is becoming an enterprise server. The mainframe vs. PC argument is for knuckleheads. Everybody's right and everybody's wrong.

Dodge is telecommunications department manager at a Fortune 100 company.

Just say 'yes' to the Internet

Patricia B. Seybold

Many corporate IS directors are afraid of the Internet. It looks like an undisciplined universe of hackers just waiting to besiege their corporate systems and waste their employees' time.

You can't quarrel with that point of view. It's founded on more than a grain of truth. But you can take pity on the companies whose top executives hold these prejudices because those firms will become the dinosaurs of the information economy. If you're not an active Internet citizen by the mid-1990s, you're likely to be out of business by the year 2000.

If you're not an active Internet citizen, your company will be cut off from information and customers from around the world.

Over and over again, I meet people who apologize when they hand me their business cards. They're embarrassed that they don't have an Internet address on their card. They hang their heads and explain that their company has an anti-Internet policy. But they also worry that they don't "measure up." Remember when you had to add your fax number to your business card? The lack of a fax signaled to the world that you weren't serious about being in business. Today, the lack of an Internet address sends the message that your company is not serious about electronic commerce or about cooperation with business partners and customers.

Without an Internet presence, your company is cut off from access to free research, to valuable databases and information, to experts in almost every field and to potential customers all around the world.

What should you do about this dilemma? How can you lead your company safely onto the electronic frontier? First, you need to understand the Internet. Read several of the many popular books on the subject. Understand the allure of the frontier. Gain some personal experience. Get an Internet connection and download the Mosaic interface (which any Internet jock can help you find and install) on your PC, Macintosh or Unix workstation or terminal. Once you see how easy it is to avail yourself of the information resources that are freely available on computers in libraries, government offices, universities and other businesses around the world, you'll see how the game is played.

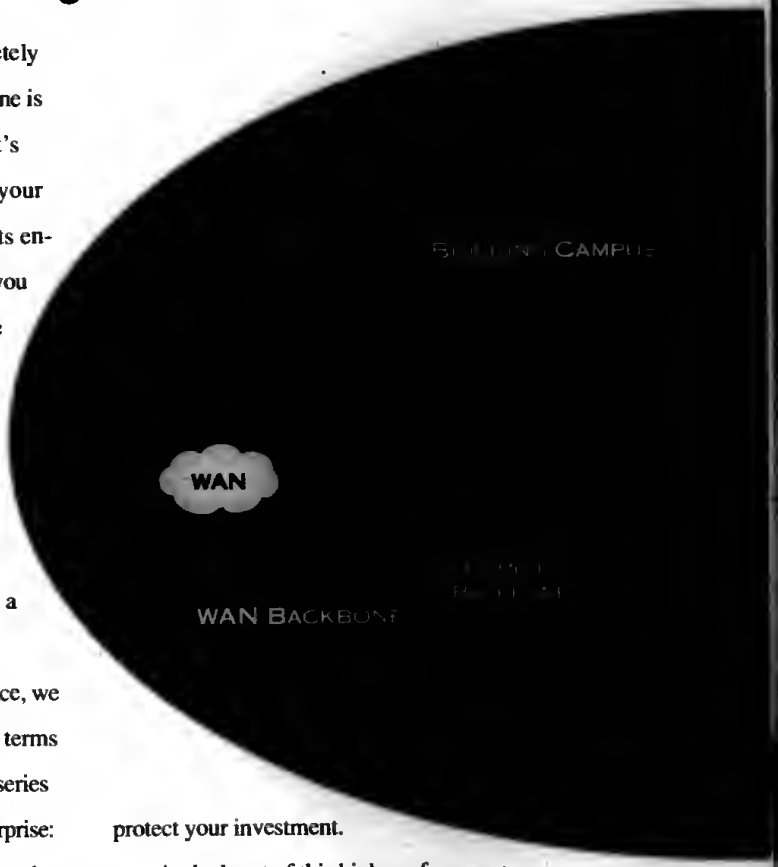
Do an internal benevolent Internet audit. Your company may have a "no Internet" policy, but I can almost guarantee you have employees who have ventured onto the 'net on their own. Recruit them to form your Internet center of expertise. They'll be invaluable in setting corporate policies about Internet usage. They know what the pitfalls are, what the time sinks are and how to avoid them.

Next comes the corporate plan of attack. Appoint someone to be in charge of your organization's Internet access architecture and corporate policies. Authorize Internet access through a well-designed and approved setup. This means that you place fire walls on your Internet servers. Your employees can send and receive mail and access files, but no one can get into your systems. If you're smart, you will place one server beyond your fire wall containing just the information you'd love your prospects, customers and other stakeholders to have access to — information about your products and services, including easy-to-use forms for ordering products and services from you. Then, stand back and watch the orders flow in.

Seybold is president of Patricia Seybold Group in Boston. Her Notes address is Patricia Seybold@PSOCG. Her Internet address is PSeybold@PSGroup.com.

The whole is always great
Incidentally, in networki

■ As confusing as it sounds, there truly are two completely opposing ways to look at high-performance networking. One is the big picture, the sum total of your network. Because it's only by viewing your network in its entirety that you can be sure it's carrying your organization toward the future without compromising the investments you're making today. Conversely, you can't afford to overlook the smallest detail either. After all, unless it responds and even anticipates the needs of the individuals using it, a network has failed to live up to its potential.



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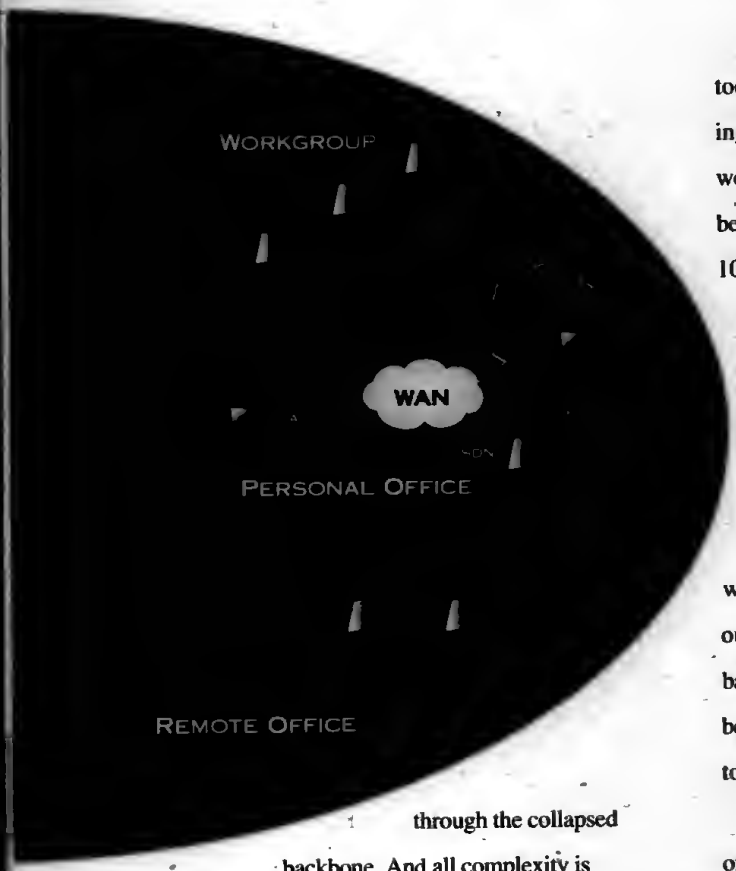

through the collapsed backbone. And all complexity is centralized, where administrative costs are substantially lower.

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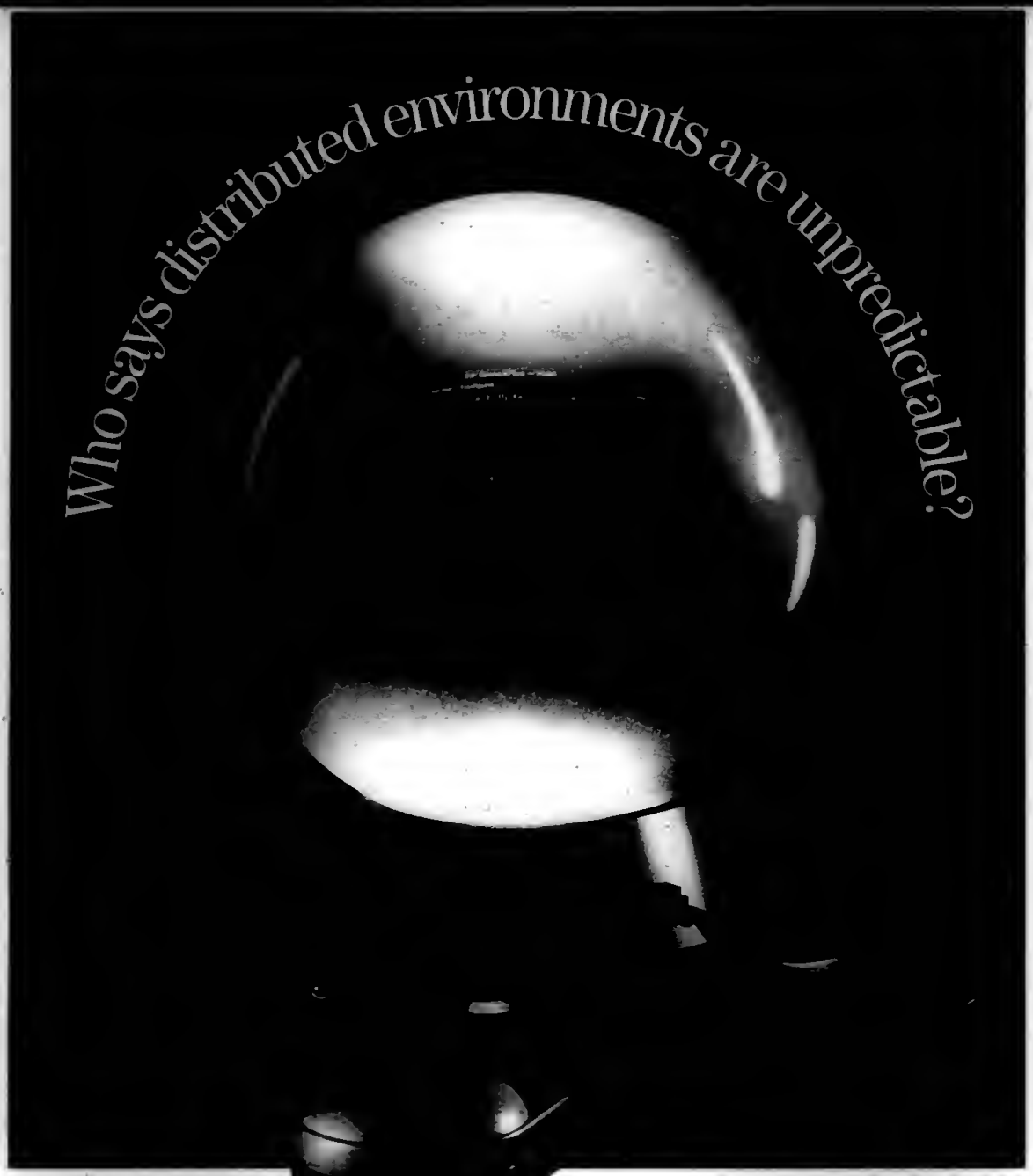

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Microsoft to deliver desktop DBMS duo

By Stuart J. Johnston

■ Microsoft Corp. takes another swing this week at dominating the desktop database arena, unveiling a one-two punch of twin database updates.

The company will announce today that Access 2.0 will reach dealer shelves in about three weeks, following on the heels of FoxPro 2.6, which should be available this week, Microsoft officials said.

Priced to sell

Trying to repeat its earlier success in unseating rival Borland International, Inc.'s dBase through low-ball pricing for Access 1.0, Microsoft will price FoxPro 2.6 at $99 for the standard edition of the DOS or Windows package through June 30. After that date, the price will rise to $495. FoxPro 2.5 users can upgrade for $19.95, the company said.

Microsoft will offer a 90-day $99 upgrade price to Access 2.0 to users of earlier Access versions or its Office applications suite. However, users of competing database products will pay $129. The list price for Access 2.0 is $495.

Although the two Microsoft database systems are distinct, both incorporate some of the same technologies in their new releases. These include the addition of more wizards — templates that simplify many tasks — such as one for creating many types of tables.

Other features the two have in common are support for Object Linking and Embedding (OLE) 2.0. Access 2.0 also now incorporates the Rushmore fast search technology that was pioneered in FoxPro.

FoxPro 2.6 provides a Catalog Manager tool that lets database developers manage all database files, such as tables, queries, screens, labels, reports and programs, from a central point.

The update also provides a more automated way to import dBase files, including conversion of screens to a FoxPro format.

To lure users

"Our big message is that 2.6 is all about making it as easy as possible for dBase users to move to FoxPro," said Steven Murch, FoxPro product manager.

In addition, FoxPro 2.6 adds more than 50 new dBase commands to improve compatibility with dBase IV 2.0. A transport

Microsoft, *page 41*

New tricks for old PCs

Companies find savings by upgrading instead of buying

By Jaikumar Vijayan

When PECO Energy reviewed its information systems requirements last summer, it decided to try something new. Instead of replacing its aging PCs with newer and faster systems, the company opted to upgrade its installed base.

The process is still not complete, but the results — at least in terms of cost-justification — have been fairly satisfying. The company has saved an estimated $40,000 in hardware costs in the past year, according to Linda Abraham, manager of end-user services at PECO, formerly known as Philadelphia Electric Co.

New lease on life

"Instead of budgeting for brand-new PCs, we decided to find a way to redeploy our older machines through planar board and hard drive upgrades at a reasonable cost," Abraham said. So far, PECO has extended the life of nearly 400 of its IBM PS/2s by upgrading their planar boards to boost power and performance. Another 350 will undergo the same transformation.

Renewal is also a means to protect the asset value of computers, according to Abraham. Upgrade costs can be budgeted as an operating expenditure instead of a capital expenditure. The cost of renewing an old PC can be amortized over the approximately three years of extended life gained from upgrading, Abraham said.

"Not everyone wants to throw away old PCs. Some would like to protect their investments," said Chris Larsen, marketing vice president of Toronto-based LCC Computers, Inc., which specializes in upgrading PS/2 systems. Last year, the company upgraded more than 4,500 PCs, including systems at PECO and The Chase Manhattan Bank NA. LCC, which recently signed a remarketer agreement with IBM, hopes to refurbish at least 20,000 PCs this year.

Upgrade how-to's

Larsen's firm is among those companies that re-engineer PC installations by combining some parts of an existing PC with new components to create a higher-performance system at a lower cost than a new system.

There are many ways to enhance system performance, according to Larsen. The most common method involves replacing the system board with upgrade boards from companies such as IBM and Cyrix Corp. Other upgrade products include clock-doubling CPUs, memo-

PCs, *page 45*

Symantec tries out a new Act

By Michael Fitzgerald

Symantec Corp. has released a new version of its Act for Windows contact manager, designed to work within a networked environment.

Act 2.0 adds several features that users said help them in their jobs, including support for networking, integrated electronic mail and an enhanced calendar and address book.

Users said they were particularly pleased with the network features.

"We're in essence running our office through Act," said Donald E. Brown, president of Fiduciary Associates, Inc., a trust firm in Winter Park, Fla. Act replaced WordPerfect Corp.'s Office package in his business.

Brown said the company has all of its contact information on the networked version of Act, which lets Fiduciary's employees easily track the history of a particular account. Employees generate most of their correspondence through the integrated word processor in Act.

Brown said he would like to see more flexible password protection with Act because workers cannot check schedules on-line without logging out of their system and then logging in as another worker.

While this would seem to flout the need for personal security, "if you look at the way offices run . . . you don't want to have to log out and then log back in as someone else to schedule an appointment for them," Brown said.

Network news

At IDS Financial Services, Inc.'s office in Minneapolis, "We need a client management system that allows us to be networked," said Keith Gasner, a certified financial planner and Act beta tester.

Gasner said IDS, which has 7,000 financial planners, will upgrade from the DOS to the Windows version of Act, in large part because the Windows version gives the company a networked database.

Early results from the new version showed a productivity gain of three to four times, Gasner said.

The new integrated networking automatically merges E-mail from a host system to the user on the road. With Act, users can now send and receive messages from Act through Lotus Development Corp.'s CC:Mail and CC:Mail Mobile, Microsoft Corp.'s Mail and services such as CompuServe.

Growth market

- Contact management is roughly a $60 million market; however, it is growing at a rate of 75% a year, according to Symantec.

The users

Approximately 30% of Act users use only a notebook computer; 50% of all its users have a fax/modem.

John Russo Jr., group product marketing manager at Symantec, said the product's next version will take synchronization a step further by incorporating automatic database synchronization from a remote workstation. This version is due later this year.

One analyst called the new features a significant step forward for Act.

"The important thing was to make sure people understood it's not a [personal information manager], and this will let them do that," said Chris LeTocq, an analyst at Computer Intelligence/InfoCorp in Santa Clara, Calif.

The company also dropped the price significantly, from $399 to $279.95. Current DOS and Windows users can upgrade for $69.95, while users of 1stAct or Act for the 95LX from Hewlett-Packard Co. can upgrade for $99.95. A four-node network pack costs $799.

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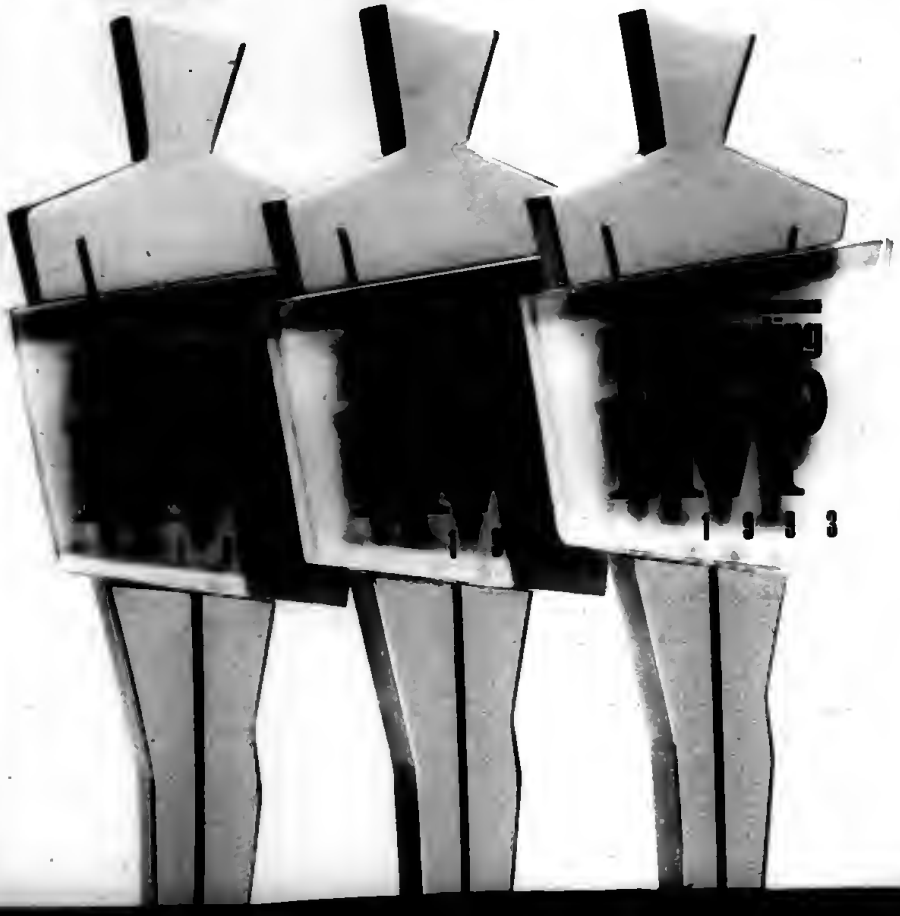

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(c) OS/2 (g) Windows
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App. Development Products ❑ Yes ❑ No
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Microsoft duo

CONTINUED FROM PAGE 39

function helps developers migrate their FoxPro code between FoxPro platforms on DOS, Windows and the Macintosh.

Professional editions of FoxPro 2.6 for DOS and Windows are priced at $695 each. The professional editions include the standard edition plus a runtime distribution kit and a library construction kit that lets developers write C language routines for FoxPro. They also provide an Open Database Connectivity kit for connecting to SQL databases and a set of workgroup extensions for mail-enabling database applications.

Access 2.0, which will be announced today at the Microsoft TechEd conference in New Orleans, features an enhanced version of Access Basic that has most of the features of Visual Basic Applications (VBA) Edition, said Mary Engstrom, group product manager of the Access business unit.

"It's not a superset or a subset of VBA, [but is] about 10% different," Engstrom said. "For example, now you have programmatic control of data definitions."

Object support

Also included in Access Basic is support for OLE 2.0, including application automation — the ability to drive other programs from within Access, or for Access to be driven by other OLE 2.0-enabled programs such as Excel 5.0. Access 2.0 also includes several OLE 2.0 Custom Controls that can be incorporated into users' applications, including a sample calendar, a slider control and a data outliner that lets users look at data hierarchically.

Under the hood, Microsoft has added a lot of other small improvements that define the update, according to Mike Proto, database team leader in the technology planning and assessment group of Pacific Gas & Electric Co.'s client support services department in San Francisco.

Access 2.0 "is more of a consolidation of what's already there [in Access 1.0] than an extension," Proto said. He cited many areas of refinement as reasons why "if you like 1.0, you'll love 2.0."

Among the improvements are the automatic recognition of data types — for example, Access 2.0 automatically recognizes that a Social Security number is a text data type instead of a numerical data type — and an automatic quick sort feature.

Also added to Access 2.0 is support for Microsoft's Office Links technology that, for instance, lets a user create a link to a word processing document for mail merging from a database automatically.

The update's tool bar also looks the same as Microsoft's other productivity applications, with eight out of the first 10 icons matching, said David Risher, Access product manager.

Access 2.0 either adds or improves 35 wizards and lets a user drag an often-used query and drop it on the tool bar where it will be available whenever the user wants to execute it; lists of databases display icons to identify what database product created the data. The system also provides support for Microsoft's Cue Cards and IntelliSense technologies.

A new version of the Microsoft Office Professional edition, called Version 4.3, will also be available with Access 2.0 included, Engstrom said.

Additionally, an Access Developer's Toolkit, which includes the Access distribution kit and Visual Basic 3.0, will be available for $495.

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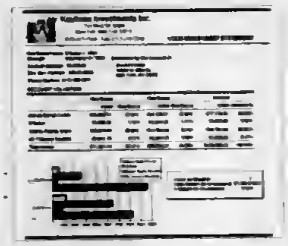

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If there's one thing we've learned working with our customers, it's that you're running more and more mission-critical applications on your network. And if your network goes down, your business goes down. All of which should give you a better sense of why we built the Compaq ProLiant servers.

ProLiant is our family of affordable, high-performance and easy-to-manage servers engineered specifically to provide the high availability you need for mission-critical networks. We've designed ProLiant in three different models, ranging from a single-processor configuration to a four-Pentium processor model.

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If the performance of a monitored component drops below a specified level, our unique Pre-Failure Warranty kicks in. We'll actually replace a Compaq warranted drive or memory system free. Before it stops working. No downtime. Ringing cash registers. Happy boss.*

Still, no network's perfect. In the unlikely event a problem occurs, our servers exhibit remarkable tolerance. Every ProLiant includes Compaq-designed hot-pluggable drives. ProLiant Models 2000 and 4000 come standard with advanced error-correcting memory and off-line backup processor features (whereby the server reboots automatically to a second processor). And, most notably, the Compaq Smart SCSI Array Controller together with the ProLiant Storage System ensures mission-critical data integrity. Should a network problem bring the server down, the Rapid Recovery Systems of the ProLiant are designed to bring it back up.

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Fault Recovery	Standard rapid recovery services automatically return server to full operational status even in the event of a critical subsystem failure		
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SmartStart	Standard CD-based intelligent hardware configuration and system software installation, providing simplified server configuration for NetWare, NT or Unix. (CD-ROM drive standard)		
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Pre-Failure Warranty	Three-Year, On-Site Warranty replacement of designated components that fall below preestablished thresholds		
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Technical Support	Toll-free, 7 x 24 technical phone support from Compaq engineers		
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Tricks for old PCs

CONTINUED FROM PAGE 39

ry modules, hard drives and video accelerators.

"Taking something from a 386DX to a 486 could cost as little as $295 for a CPU upgrade and around $1,500 for a system board upgrade," Larsen claimed. A fully upgraded high-level PS/2 system would still cost at least 30% less than a new system, Larsen said.

Memory-boosters

Autotime Corp. in Portland, Ore., has developed a procedure that allows users to increase the density of their memory chips rather than replace them. According to Autotime President Mike Faunce, it is possible to reconfigure the logic of eight 256K-bit chips to form 1M-byte single in-line memory modules (SIMM) for as little as $18.50 and 1M-bit memory chips into 4M-byte SIMM modules for around $34.

Yet despite the obvious attraction of lower costs, the benefits of upgrading are situation-specific, according to Hugh Hoffman, assistant director of IS at Northwestern Mutual Life Insurance Co. in Milwaukee. "Midlife kickers, if they get to be expensive, don't make too much sense," Hoffman said, referring to upgrades. Factors to be considered are life expectancy of the upgraded PC and the cost of performing the upgrade, he said.

Chris Goodhue, senior analyst at Gartner Group, Inc. in Stamford, Conn., predicted that 10% to 15% of the current installed base of nearly 184 million PCs worldwide will be replaced or unplugged by 1995. Out of this only about 5% will be upgraded, he said.

Joseph W. King, president of Crossroad Partners, a Lotus Development Corp. Notes business partner in Shrewsbury, N.J., and former assistant vice president at Continental Insurance Co.'s data center, said it is not always wise to upgrade systems.

"If one is talking about CPU upgrades, I don't think it makes any sense whatsoever. I have found that they create compatibility problems, especially with OS/2 and Windows, and they tend to make a machine configuration look like nothing OS/2 has seen before."

Inline Software, Inc. has introduced PopupFolder, a utility for the Macintosh that hierarchically displays the contents of all folders and volumes in the Finder application.

According to the Lakeville, Conn., company, PopupFolder also works within an application's open and save dialogs, giving the user immediate access to all files.

PopupFolder requires Apple Computer, Inc.'s System 7 and runs on a Macintosh Plus or higher with 2M bytes of RAM. It costs $59.95.

▶ *Inline Software*
(203) 435-4995

Manugistics Group, Inc. has announced the Windows version of Statgraphics Plus, a PC-based statistical graphics analysis software tool.

According to the Rockville, Md., company, Statgraphics Plus is a true Windows-based application built without reusing code from previous DOS versions.

The product offers integrated, interactive graphics and StatFolio, a system feature that saves and reuses work without writing code or recording macros.

A Dynamic Data Exchange link to popular Windows spreadsheets is included.

Statgraphics Plus for Windows costs $649 for the Base System and $399 for each additional module.

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Client/server setup targets big bucks

By Mark Halper

Harvard University will launch in August what it claims is the largest fund-raising campaign in collegiate history, and it will lean heavily on client/server technology to help it meet its five-year, $2 billion goal.

The star component of the supporting computer system will be a homegrown, front-end application that will provide some 250 fund-raisers with personal and financial information on prospects. It will help the fund-raisers become virtual best friends with half a million individuals identified as having "money to burn."

Chief among the intended benefactors are the targeted 10% elite who make 90% of total contributions in any fund-raising effort, according to James Conway, Harvard's director of development computing services.

Under Harvard's plan, the cream of that crop, or about 20 donors, will hand over some $20 million each.

As Conway noted, "To ask someone for $20 million, you don't just come in and ask for $20 million. It takes two years to cultivate the relationship."

All the goods

That's why Harvard is developing a sophisticated tracking and management program that will enable the 250 fund-raisers to peer at a computer screen and view encapsulated biographies that will help them get chummy with the university's would-be benefactors.

Screens on Macintosh computers and 486 PCs will tie in to a Sybase, Inc. database housed on a Sun Microsystems, Inc. 690 server via Ethernet and TCP/IP links.

The screens will not only display fund-raising basics, such as phone numbers, addresses and donation history, but also outfit fund-raisers with invaluable bits of personal information that is many a salesperson's dream.

With a glance of an eye or click of a mouse, information such as the subject's favorite drink, names of spouse and children, hobbies and activities, golfing buddies and favorite vacation spots will be available to help a fund-raiser keep the conversation moving along in an effort to win the good graces of the candidate.

This information is entered initially by the fund-raising staff, which over time creates a comprehensive compendium of personal data to help Harvard clinch its contributions.

"It includes assistants' names because for world leaders, you're dealing with their secretaries," Conway said.

What's more, roughly 20 staffers will constantly feed the system with data culled from public sources such as Securities and Exchange Commission filings and real estate sales. Such data will help fund-raisers size up the pot of gold available to Harvard from any one prospect.

Included in the database are reports of conversations, meetings and outings with the candidate. And if the candidate has received a thank-you letter from the university president, the system takes note to prevent the donor from receiving the same letter in the future.

Harvard's James Conway: *'To ask someone for $20 million, you don't just come in and ask for $20 million'*

The system includes a link to a source of highly likely prospects, the Harvard Alumni Association, and keeps tabs on the whereabouts and financial wherewithal of Harvard graduates.

"Once you're a Harvard alum, it's very hard to get lost," mused Philip Gow, who is now president of Renaissance Information Systems in Cambridge, Mass. While at Harvard, he was a lead designer on the system.

Among other purposes, all this information is intended to let the cadre of fund-raisers know that a particular indi-

Harvard, *page 48*

Harvard central

The August campaign at Harvard University will mark the first step toward an expected centralization of many business and computer activities that have long been scattered among the various colleges.

A university information technology team is currently investigating technology that would support the centralization of finance and human resources operations, according to James Conway, Harvard's director of development computing services.

The leader of that project, Ann Margulies, is evaluating Microsoft Corp.'s Windows NT and Unix as options, Conway said. Margulies did not return phone calls requesting information on her projects.

Conway said the shift began at Harvard soon after Neil Rudenstine took over as president of the university in the fall of 1991 and supported centralization in a marked shift from his predecessor, Derek Bok.

Conway's group in the past has supported fund-raising for the liberal arts school, Harvard College. During the next year it will add support for Harvard's medical, divinity and design schools and will tie in to the president's office, the governing board and the Harvard Alumni Association.

Harvard's law school will remain on its own fund-raising system, Conway said. He declined to elaborate.

—Mark Halper

IBM expands Ethernet, Token Ring offerings

By Stephen P. Klett Jr.

IBM unveiled a slew of products last week aimed at improving users' connectivity, bandwidth and management capabilities enterprisewide.

While most of the hardware products focused on Token Ring, analysts singled out a low-end Ethernet switch as the highlight of the announcement.

The first in a family of Ethernet switches to debut from IBM, the EtherStreamer Switch provides a dedicated path for up to eight devices or LAN segments. When combined with a full-duplex network adapter card, such as IBM's EtherStreamer adapter, the $4,800 switch will support simultaneous, two-way 10M bit/sec. data transmission with a network server. This strategy can be a cost-effective interim strategy for users who are experiencing a bandwidth pinch until mature, high-speed networking products are available.

Steep competition

Observers said it was critical for IBM to come out with an Ethernet switch at this time in light of fierce competition in this market segment.

"IBM is really trying to get their LAN house in order here — they haven't been a market leader for the last five years, and they're trying to catch up," said Tom Nolle, president of consultancy CIMI Corp. in Voorhees, N.J. Nolle said the switch was a welcome alternative to full-duplex Token Ring — IBM's previous strategy for boosting bandwidth in shared-media LANs — which is expected to be too costly to compete with comparable Ethernet products.

Laura Deets, LAN manager at Aon Specialty Group, a Token Ring shop in Chicago, agreed. "It's an attractive option should we decide to move to Ethernet when installing new LANs in the future, which is a distinct possibility due to [Ethernet's] lower cost," she said.

The following products were also announced by IBM last week:

- **AutoLANStreamer MC 32 Adapter:** A full-duplex-enabled Token Ring adapter that will automatically determine and set the correct speed of new workstations added to the network. Cost: $765.
- **PCMCIA adapters:** For Token Ring and Ethernet networks at prices starting at $495 and $225, respectively.
- **AIX Router and Bridge Manager/6000:** A router management software package that supports Advanced Peer-to-Peer Networking and Data Link Switching. Cost: $6,995.
- **8229 Token Ring Bridge:** A replacement for the 8209 Token Ring/Ethernet bridge that can provide a connection between two remote Token Ring segments at up to T1 speeds. Pricing starts at $564.
- **Frame Relay Bridge/DOS:** Provides source-route bridging between DOS-based workstations on remote Token Ring segments over a frame-relay link. Cost: $1,150.
- **Route Xpander/2 routing software:** Added support for X.25 and IPX.

Harvard

CONTINUED FROM PAGE 47

vidual has been earmarked for a top-echelon contribution.

"One person can't go in and ask for $10,000 before someone else goes in and asks for $20 million," Conway observed.

The venerable educational institution is using a computer from a venerable minicomputer line — Hewlett-Packard Co.'s proprietary HP 3000 — to anchor transactions for the system.

Conway explained that the HP 3000 Model 987 will process gifts and then feed updated information in Sun's Sybase database through a file transfer protocol connection.

Harvard has been an HP shop for years and is using the 3000 so it will not waste existing technology, he said.

Harvard chose the Sun servers over HP servers two years ago because HP machines at that time were twice the price of comparable Sun computers, and HP salespeople were unresponsive, Conway said.

"I told HP the job was theirs to lose, and they did," he recalled.

The desktop computers will use Blyth Software, Inc.'s Omnis front end tied to the Sun through a TCP/IP network.

One of the major design challenges, Gow said, was to decide how to divide the labor procedures between the front-end Omnis program and the back-end Sybase application.

"As a rule of thumb, if it's a process that happens all the time, we'll use it on Sybase, and if it's particular to a specific query, like a guy with blue eyes and a dog named Joe who gives so many dollars, we'll put it on Omnis," Gow said.

Learning client/server

Gow and Conway both recalled another major challenge: getting Conway's staff of about 30 information systems workers, who were accustomed to working on terminals that access the HP 3000, to work in a client/server world.

To help overcome resistance, Conway said, he has been sending his staff to client/server conferences and seminars.

Workers' attitudes are changing, but slowly.

"Some of them still refer to Macs as terminals," Conway said.

Briefs

Tuxedo gets enhanced release

Novell, Inc. announced Tuxedo Version 4.2.2, an enhanced release of its Tuxedo transaction monitor and client/server middleware product. Tuxedo now supports Novell's IPX/SPX network protocols. Future versions will support Novell's NetWare Loadable Modules (NLM), NetWare LAN software and Novell's AppWare application development product, the vendor said. Tuxedo 4.2.2 also supports the development of client/server applications with Gupta Corp.'s SQLWindows and Powersoft Corp.'s PowerBuilder.

NLMs to run on PowerFrame

Network Specialists, Inc. and Tricord Systems, Inc. announced that Network Specialists' Balance, Redundancy, RouteOff and NetBIOS-Off NLM will run on Tricord's PowerFrame superservers. The NLMs were designed to improve server performance and fault tolerance.

ICL announces servers

ICL announced 25 servers, priced from $4,100, that were co-developed with its corporate parent, Fujitsu Ltd. The ICL servers are based on Fujitsu's SPARC RISC chips and Intel Corp.'s Pentium. Users can choose between running Unix System V Release 4.2 and SCO Unix on SPARC machines and running Microsoft Corp.'s Windows NT, Novell, Inc.'s NetWare or IBM's OS/2 on Pentium machines. Shanker Trivedi, product marketing manager for ICL's server systems division, said the firm will build up its U.S. sales force because ICL's installed base is in Europe and Asia.

Certification granted

Core International, a unit of Aiwa Co., said its LAN Array and MicroArray redundant arrays of inexpensive disks (RAID) have been certified for compliance with the technical guidelines set by the RAID Advisory Board vendor group. The Core products support RAID Level 3 and 5 capabilities and are marketed for use with LANs and midrange systems.

Dodge gets new COO

Steven Wright has been named president and chief operating officer of The Dodge Group, a Waltham, Mass., developer of financial client/server software. Wright, who will initially manage The Dodge Group's domestic and international field operations, has been president and COO at Landmark Systems Corp. in Vienna, Va. Frank Dodge, the group's founder, will continue as chairman and chief executive.

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JetForm adds client/server capabilities

By Lynda Radosevich

■ Users looking to automate the flow of electronic forms over a LAN said they were interested in major enhancements to JetForm Corp.'s electronic forms software that add several client/server features.

The Waltham, Mass., company said it began shipping JetForm 4.0 last week. The updated version includes the forms design and filling software of its 3.1 release and adds server-based administration and workflow capabilities, electronic-mail integration and access to SQL and other databases. These features improve the product's suitability for building distributed forms applications and automating workflows across LANs and wide-area networks, according to users.

"We're downsizing applications to the PCs driven mainly by Oracle databases," said John Coon, a JetForm 4.0 beta tester and software engineer at a nuclear generating station in southern California. "Having the ability to access and process that information using electronic forms is very significant to our downsizing strategy."

The JetForm Design package includes Open Database Connectivity drivers that enable programmers to link fields in the electronic forms to fields in Oracle Corp.'s Oracle, Borland International, Inc.'s dBase and Paradox, IBM's DB2 and other SQL databases.

The server software, which used to just issue print requests, now includes a forms-tracking database, automatic forms faxing capabilities and a printer module that will issue forms printing commands to a remote printer via E-mail.

Additionally, the forms filler software comes bundled with imaging software from Watermark Software, Inc. and Object Linking and Embedding 2.0 support that lets users embed other applications or images into any form.

However, Coon said JetForm 4.0 is cumbersome to install on a network and that he had to write his own loading program to simplify the process for PC users.

For the Pacifica Hospital in Huntington Beach, Calif., the enhanced JetForm software will be part of a low-cost alternative to what might otherwise be a half-million dollar information system, according to material director Jeff Johnson.

The enhanced JetForm 4.0 *software will be positioned as a low-cost workflow alternative*

The hospital already uses JetForm to keep electronic inventories rather than paper-based forms. Now the hospital plans to build a forms database that lets nursing floors, hospital administration, the emergency room and other departments share information using JetForm forms routed via Lotus Development Corp.'s CC:Mail.

"Two years ago, you couldn't even dream of doing this on a LAN," Johnson said.

Pacifica Hospital will save an estimated $5,000 to $10,000 off its $100,000 per year printing costs by creating, storing and distributing forms electronically.

The right package

Although he looked at other LAN-based forms packages, including one from Microsoft Corp., they did not have the same combination of forms design and database access features that JetForm does, Johnson said.

All three JetForm 4.0 components are shipping on Windows, DOS and Macintosh clients and Unix, Microsoft's Windows NT and OS/2 servers will ship later this year.

JetForm Design is priced at $495, Filler at $129 per user and Server at $795 for five users.

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X.500 has promise but is no panacea

Users consider standards compliance a low priority

By Lynda Radosevich

Corporate users are dissatisfied with current directory service products but are not yet confident enough in the X.500 standard to base their purchase decisions on it. That is because X.500 does not promise to solve integration, management and application access issues, according to a recently released study.

Slow to catch on

"It's new, it's expensive to implement, and it's not yet clear to users that it's the best solution," said Nina Burns, president of consultancy Creative Networks, Inc. in Palo Alto, Calif., and author of the report.

X.500 is an international standard for coordinating different directory services across distributed systems. While vendor compliance with X.500 promises to help make their products' name and address services easier to integrate, the standard is not very well implemented and does not yet carry much weight with users.

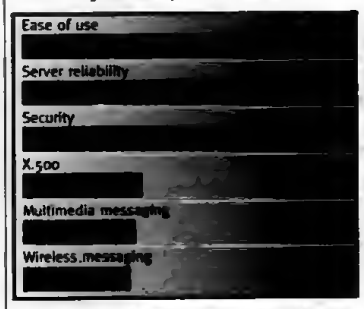
"I think we'll see multiple directory structures for 10 years," Burns said.

Corporate users are most concerned with setting up messaging systems that are easy to use, reliable and secure. Many companies put standards compliance low on their priority lists, Burns added.

Meanwhile, to deal with integrating proprietary directories, users are turning to message and directory switches such as those from Soft-Switch, Inc., Worldtalk Corp. and Alisa Systems, Inc., she said.

Messaging priorities

In a study of 103 large companies, interest in X.500 directory services was low



SCALE: 0 IS LEAST IMPORTANT AND 5 IS MOST IMPORTANT

Source: Creative Networks, Inc., Palo Alto, Calif.

Which came first?

It is unclear whether the current lack of user interest in X.500 services stems from the lack of X.500 products and tools, or whether the missing products and tools stem from a lack of user demand.

Whatever the case, major electronic messaging vendors are preparing to comply by changing their proprietary addressing and directory schemes to more closely match the hierarchical architecture of the X.500 standard.

Those vendors include Novell, Inc., Banyan Systems, Inc., Lotus Development Corp., Microsoft Corp. and Soft-Switch.

That could coincide with customers' time frames, as X.500 creeps up to the top of user lists over the next two to four years, Burns said. Users will implement X.500 as they migrate to newer wares that comply with the standard.

"It's not important to us that a directory service is pure, 100% X.500, but if I can get as close to it as I can, I can avoid some maintenance issues," said Don Price, a technologist at Texaco, Inc. in Tulsa, Okla.

Interest in X.500 will likely follow a path similar to that of the X.400 standard for routing messages. The X.400 standard was published in 1984 and updated in 1988.

However, in 1994, LAN electronic-mail vendors such as Lotus and Microsoft still have not delivered native X.400 messaging transports that do not require gateways to exchange messaging with other X.400 systems.

"We think the same thing is going to happen with X.500 products. But that doesn't mean you don't do something because all the commercial tools aren't there," said Gene Hughes, a computer specialist at the U.S. Department of Energy in Washington.

Going agencywide

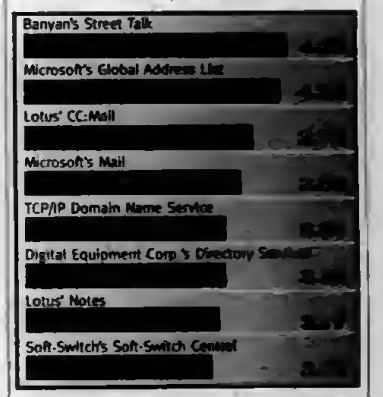
Hughes said he hopes to set up an agencywide directory service based on X.500 in the next 12 to 18 months. The service will include E-mail addresses and other information on the 160,000 employees, researchers and contractors with whom the department works.

Initially, the department will use X.500-like switching software from Worldtalk to integrate Unix, minicomputer and LAN-based E-mail directory information.

Also, the department will likely write its own user application programming interface so users can access an external X.500 "white pages" directory project. That project is piloted by Lawrence Livermore National Laboratory in Berkeley, Calif., Hughes said.

Satisfaction not guaranteed

A survey of 50 large companies shows Notes and Soft-Switch Central directory services leave room for improvement



SCALE: 0 IS LEAST SATISFIED AND 5 IS MOST SATISFIED

Source: Creative Networks, Inc., Palo Alto, Calif.

Computer security

SecurID keeps passwords a'changing

By Gary H. Anthes

According to alerts put out by the Computer Emergency Response Team at Carnegie Mellon University, thousands of computer passwords have been stolen recently by Internet interlopers, and millions more are at risk.

Passwords represent the Achilles' heel of computer security. Some passwords are easily guessed; others are subject to capture as they travel over networks; still others are left carelessly around offices, perhaps taped to the bottoms of keyboards.

Users have taken precautions ranging from instituting corporate policies that mandate the use of hard-to-guess, frequently changed passwords to using "fire walls," specialized computer gateways with security filters and other protective measures built into their software. One solution uses randomly generated passwords that are used just once. (See related story page 28.)

A password a minute

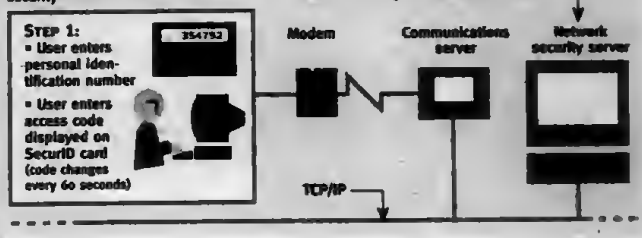
Security Dynamics, Inc. in Cambridge, Mass., has implemented the latter concept in its SecurID smart card, a credit card-size device that computes and displays a new, unpredictable six-digit password each minute. A corresponding feature is implemented in hardware or software on a host or network server, so the user card and the host machine always agree on what password is valid for users at any moment. Clocks in the card and the access control hardware are synchronized to Greenwich Mean Time.

In addition to the security the extremely short-lived passwords offer, the SecurID system adds another layer of security in the form of a secret personal identification number (PIN), which the user enters with the password. If the card is lost, it is unlikely that an unauthorized user will be able to supply the correct PIN. Security Dynamics said the odds of defeating SecurID are less than one in 14 billion.

SecurID, *page 52*

Open sesame

Identification cards enforce network security



Novell increases NetWire support

By Elisabeth Horwitt

Novell, Inc. plans to beef up support for NetWire, a group of CompuServe forums where users ask one another and designated systems operators for help solving day-to-day NetWare problems and get information about recent Novell products.

The vendor recently put out an electronic message on NetWire asking users who are interested in becoming systems operators to get in touch.

Novell currently has 12 to 15 of these systems operators, who are users with experience in one or more of its key offerings. They monitor and respond to complaints and questions posted on the CompuServe NetWire forums. Systems operators who encounter problems outside their expertise can contact Novell technicians, who also monitor the forums occasionally, said Jan Newman, Novell's senior vice president of systems, service and support.

An abundance

Novell originally expected 30 to 40 applicants for the systems operator jobs, from which it hoped to get enough quality people to boost total systems operator numbers to 20 or 30, a company manager said. Instead, Novell has had some 600 applicants, so the final number of operators may be larger.

More support and expertise

Novell's plans to strengthen systems operator support involve increasing the number of operators and ensuring they have expertise in product areas that are important to customers but are currently undersupported, Newman said.

One such area is the AppWare family of client/server application development tools; another is NetWare connectivity products such as NetWare/IP and NetWare for SAA, which puts NetWare clients in touch with IBM SNA hosts, he added.

As expected, customers said they wholeheartedly support a beefed-up NetWire. "Better support on NetWire is key to LAN administrators, given that the CompuServe forums provide one of the few viable ways they can get help with day-to-day network problems," said Ed Hiller, a data processing supervisor at Little Rock Wastewater Utility in Arkansas.

Time-consuming and expensive

While Certified NetWare Engineers can get direct Novell technical support over the telephone, others "are asked to get out their credit cards and pay $100 per incident," Hiller said. Sometimes, he added, users "get shuffled around a lot from one support person to another" before the problem is solved.

While Novell does not pay its designated helpers, it does offer certain incentives, including free admission to one of the yearly Interop, Networld or Brainshare conferences and free prerelease software in the areas the systems operator actively supports. However, it seems likely that many operators do their work for the joy of it; indeed, there are many self-anointed, unofficial helpers who prowl the forums and respond to their colleagues' cries for help.

Contrary to a recent press report, Novell is not scaling back direct support from its technical people on NetWire, Newman said. The vendor is in the process of creating a formal escalation process by which systems operators can contact layers of Novell technical people, he said. The total number of Novell technicians accessible through this process will actually be larger.

Novell is one of a number of networking, software and system vendors that sponsor forums on CompuServe.

ISDN interfaces

Combinet unveils first ISDN LAN bridge

By Ellis Booker

One of the many obstacles users have tripped over on the road to Integrated Services Digital Network (ISDN) has been finding the terminal devices needed to hook up to it.

Earlier this month, Combinet, Inc. in Sunnyvale, Calif., announced a first: an ISDN LAN bridge that includes a built-in ISDN NT1 interface. The NT1, or Network Termination 1, unit acts as the interface between a conventional two-wire phone line and a four-wire ISDN line.

According to Combinet, the Everywhere 160 will eliminate the need for users and small businesses to purchase separate NT1 equipment and reduce their overall equipment cost by roughly $200.

Analysts said sluggish ISDN line sales are the reason more vendors have not integrated NT1 capabilities into their core products.

But Jay Batson, a senior analyst at the Network Strategy Service of Forrester Research, Inc. in Cambridge, Mass., predicted a "rebound" in the popularity of ISDN with an emphasis on remote LAN access for individuals and small branch offices.

"I wouldn't be surprised to see ISDN customer premises equipment vendors growing two times to four times annually for a few years," he said.

In fact, AT&T Network Systems introduced in February a two-port ISDN adapter packaged with an NT1. The Express-Route Digital Adapter 2000 sells for $850. AT&T also released a new, shirt-pocket-size NT1 unit, the in-line NT1 L-230, for $230.

Combinet's Everywhere 160 bridge, which supports several LAN protocols, including TCP/IP and Ethernet, sells for $1,190. An academic discount is available.

Hughes adds routing to hub family

By Stephen P. Klett Jr.

■ Hughes LAN Systems, Inc. jumped into the turbulent "superhub" market last week, unveiling integrated routing modules for its Enterprise Hub family. Analysts said they were surprised by the announcement because Hughes is focusing on routing capabilities right out of the gate instead of on switching functions like its hub rivals.

Observers also said the company's $160 per port entry price is currently the lowest. Hughes' move follows next-generation technology announcements made by Cabletron Systems, Inc., SynOptics Communications, Inc. and Chipcom Corp. in the past six months.

However, while Hughes is positioning the Enterprise Hub for the wiring closet rather than the collapsed backbone — the playing field of high-end routers — observers said the routing capabilities may add to the confusion in the market over where the line between hub and router falls [CW, Feb. 14].

Hughes, however, is adamant that it is trying to complement routers rather than compete with them.

"We're trying to help users get more performance out of their routers," said Bobbi Murphy, vice president of marketing at Hughes in Mountain View, Calif.

For example, she said installing the router modules in the wiring closet will reduce congestion on collapsed backbone networks and improve network performance, extending the life of the backbone router.

Plenty of protocol support

The router modules, codeveloped with Wellfleet Communications, Inc., support an array of protocols, including X.25, frame relay and point-to-point at speeds of up to 2M bit/sec.

Each module can support up to four interfaces, allowing users to mix Ethernet, Token Ring, Fiber Distributed Data Interface (FDDI) and Asynchronous Transfer Mode (ATM) routing in a single hub chassis.

SynOptics and Cisco Systems, Inc. recently halted a similar joint development effort, citing low market demand and control issues.

Hughes' Ethernet and FDDI modules are slated to ship in August starting at $7,495. Token Ring and ATM modules will ship in November starting at $6,495.

All modules will include an embedded Simple Network Management Protocol agent and dedicated management processor. Hughes said it plans to unveil switching modules as well by year's end.

SecurID

CONTINUED FROM PAGE 51

Greenwich Associates, a financial market research firm in Greenwich, Conn., had its network broken into several times last year by intruders who dialed in and guessed passwords. The mischief makers, possibly including a former employee, crashed machines, deleted files and did whatever they could to keep the company from doing business, according to Mark Sirota, systems and network manager at the company.

Now Sirota's LAN, which consists of 65 Sun Microsystems, Inc. workstations and 100 PCs, is protected by SecurID. Twenty employees and data vendors use the cards to dial into a Security Dynamics Access Control Module that acts as a secure gateway to the LAN.

Reusable is out

"This vulnerability was due to the fact that most computer systems ... employ reusable passwords. There was no exposure for systems which employed ... advanced methods such as tokens or smart cards," said F. Lynn McNulty, associate director for computer security at the National Institute of Standards and Technology. He addressed Congress last week on a recent outbreak of "password sniffing" on the Internet.

The access control hardware and software and smart cards cost about $12,000, Sirota said. "It's definitely not cheap, but compared to being down for half a day at a time, it pays for itself pretty quickly."

About 3,000 Glaxo, Inc. employees use SecurID cards around the world to dial into IBM mainframe and Digital Equipment Corp. VAX minicomputers at the pharmaceutical company's facilities in Research Triangle Park, N.C. Glaxo also has Security Dynamics software installed on a fire wall system that acts as a security guard between the Internet and Unix boxes, said Chuck Ryan, manager of information technology security.

Tradition is cracking

"Dialing in with traditional user names and passwords is easily crackable," Ryan said. "That puts a lot of pressure on to look at logs every 24 hours, but that is not real-time security." Setting up new users and replacing SecurID cards, which are programmed to expire every three years, is "a piece of cake," he added.

Security Dynamics' access control software costs $1,950 for Unix-based servers and $17,000 for MVS or VMS hosts. SecurID cards average $50 each or about 5 cents per user per day, the company said.

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Gradient strategy may face uphill climb

IS officials weigh value of license manager

By Craig Stedman

■ Gradient Technologies, Inc.'s plan to develop a version of its software license manager for end users earned a guarded reaction last week from several information systems executives, who said they are interested only if the price is right.

License managers, which control access to applications by issuing "keys" to users, are becoming important as software vendors try to ensure that their products are used only by licensed users. They also give IS shops a mechanism for automating such tasks as software planning, distribution and usage tracking, analysts said.

A license manager "does a lot more than merely comply with the license," said Bill McNee, vice president and software asset management service director at Gartner Group, Inc. in Stamford, Conn. The technology should enable companies to get a firmer grasp on their software needs and avoid paying for more licenses than they need, McNee added.

Thus far, however, license managers have been marketed to software and system vendors, which usually include them in products at no extra charge. Convincing IS officials that the technology is something worth paying for may be tough for Gradient, which expects to ship the end-user version of its Ifor/LS license manager in the fourth quarter [CW, March 14].

"We certainly want to watch our liability [for misuse of software], but I'm not sure how much I'm willing to pay to keep myself honest," said James Matsey, corporate director of IS at Reynolds Metals Co. in Richmond, Va. "It would have to be fairly low-cost for us to consider doing it."

"There would have to be some very strong economic incentives because my users would scream and yell the first time they couldn't get into an application," said Tod Dixon, vice president of information resources at Northeast Utilities, an electric company in Hartford, Conn.

Dixon added that he has negotiated unlimited site licenses with most of the major application vendors that Northeast Utilities buys from, including Microsoft Corp. and WordPerfect Corp. Those deals are already saving the utility "a great deal of money," he said.

McNee acknowledged that while software vendors have an obvious financial interest in using license managers, "It's another thing to get user acceptance." He noted, however, that the cost of a license manager would not be an entirely new expense because many customers currently pay for software inventory and auditing tools that they would no longer need.

Pricing for the end-user version of Ifor/LS has not been finalized, said David Zwicker, vice president of sales at Gradient in Marlboro, Mass. The product will be pitched as a tool for adding customized license management capabilities to applications that do not have them built in by their vendors, he added.

The licensing libraries that software vendors put in their source code will be replaced in the end-user product by a "wrapper" program that system administrators would incorporate into applications via a graphical user interface screen, Zwicker said.

The user sell

Gartner Group analyst Bill McNee said he expects license managers to be included in virtually all software applications within five years. "It's important to start selling this to users so they get involved and accept this willingly rather than on a confrontational basis."

Scaling security

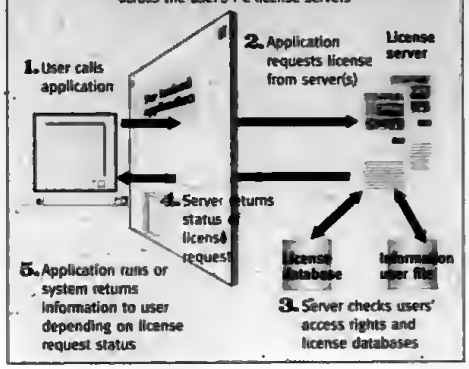
Besides the wrapper technology, the other major difference from the vendor version of Ifor/LS will involve security. The end-user software will have "emasculated" security compared with the existing release to prevent users from becoming too familiar with the full security features, Zwicker said. "We want to keep those to software developers to avoid any hostile attacking of them" by users, he noted.

The company is trying to develop a lesser security hurdle that will still be "high enough so that someone cannot inadvertently get around it," Zwicker said. It would be up to individual customers to set guidelines and policies to deal with users who circumvent the license manager, he added.

Gradient plans to support the end-user software on Windows-based PCs and Unix platforms from Hewlett-Packard Co., Sun Microsystems, Inc., Digital Equipment Corp. and IBM, according to Zwicker. A specific release schedule will be decided during beta testing, scheduled to start in late summer or early fall.

How it works

Gradient's Ifor/LS license allows distribution of information across the user's PC license servers



Informix surges ahead with OnLine 7.0

By Kim S. Nash

Informix Software, Inc. shipped its first true multiprocessing database early this month to little fanfare from mainstream Informix OnLine users, despite the product's strides in parallel technology.

OnLine 7.0 sports Parallel Data Query (PDQ), a feature cobuilt by Informix and Sequent Computer Systems, Inc. that automatically splits complex end-user queries into several parts to run simultaneously across multiple processors. Informix claims 10 to 30 times faster query processing via PDQ, yet some users said their current systems — including both OnLine 5.0 and 6.0 — are fast enough for them.

"I admire what Informix is doing with 7.0, but I bet there won't be much migration until next year or so," said Rick Creson, president of Parallel Technology Solutions, Inc., a database consulting firm in Portland, Ore., that specializes in Informix products.

Many users are just now making the transition from OnLine 5.0 to Version 6.0, so the latest database release "is pretty far off for a lot of people," Creson said.

Nevertheless, OnLine 7.0's debut means Informix has beaten rivals Oracle Corp. and Sybase, Inc. to market with a database significantly optimized for multiprocessing. PDQ in particular "vaults Informix past its primary competitors for high-end database processing functionality," said John Morrell, an analyst at International Data Corp. in Framingham, Mass. The architecture lets users take advantage of multiple CPUs, I/O channels and other simple features that work together to enhance multiprocessing performance, he said.

Almost there

While a version of Oracle runs on massively parallel computers, the database requires application programmers and database administrators to write most of the code needed to spread processing over several processors. Sybase, meanwhile, likely will not ship the parallel product Navigation Server, which it is building with AT&T Global Information Solutions, until the summer.

But Informix's full parallel processing technology is not available: Tools for parallel administration and tuning are not due until 1995, and Informix won't support Unix clusters until then. Oracle runs on clusters but does not provide the sophisticated backup and query partitioning functions in a parallel environment that Informix does, Morrell said.

For its development help, Sequent gets a six-month lead time during which it will be the only hardware provider supporting OnLine 7.0. After September, Data General Corp. is expected to jump in, along with other symmetrical multiprocessing (SMP) hardware makers.

Pricing for the product on Sequent's SMP Symmetry systems is $1,125 per user for a runtime version and $1,500 per user for development editions. Buyers must take a minimum five-user license.

Parallel visions

Each major database maker has its own view of accomplishing parallel processing

	Development Partner	Description
Informix	Sequent	Core database rebuilt to allow symmetric parallel processing; massively parallel support planned for future.
Oracle	None	Massively parallel features added into relational engine.
Sybase	AT&T Global Informations Solutions	Add-on product dubbed Navigation Server designed for symmetric multiprocessing.

David Eisenlohr
Computerworld Reader
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VP, Telecommunications
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CA client/server offerings turn heads

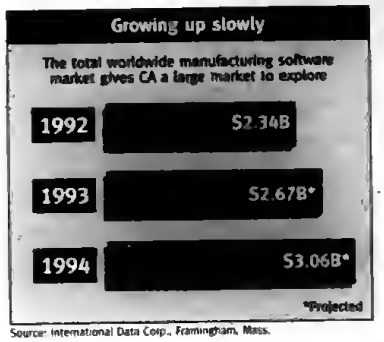
Anticipation builds as manufacturing packages near beta testing

By Thomas Hoffman

Computer Associates International, Inc.'s recently announced plans to introduce client/server versions of its CA-CAS manufacturing package — in addition to upcoming client/server extension modules for its IBM AS/400-based CA-PRMS manufacturing suite — have drawn favorable reactions from users at early test sites and prospective customers.

For example, CA-PRMS: Buyers Workbench, a client/server module designed to help manufacturers access planning data and evaluate suppliers, prices and contracts, has attracted the interest of Kesler Brass Co., a Grand Rapids, Mich., maker of decorative furniture hardware.

"The thing I like about the Buyers Workbench is that it does real-time client/server computations; it doesn't just download data from one system to another," noted David W. Shirey, manager of systems and programming at the $50 million manufacturer and a five-year user of CA-PRMS.



Source: International Data Corp., Framingham, Mass.

CA-PRMS: Buyers Workbench and four other client/server modules for the CA-PRMS package, are slated to enter beta testing by year's end and begin shipping by early 1995 for about $18,000 each, according to John Capobianco, CA's director of business applications.

Worthy Workbench

Another forthcoming CA-PRMS module, Production Scheduling Workbench, is designed to provide quick-response shop-floor control for users to maintain accurate, real-time manufacturing schedules.

Lawrence Louka, manager of operations planning at Ensign-Bickford Co., a Simsbury, Conn.-based maker of detonating systems, reacted favorably to his company's month-long testing of the module.

Louka said he hopes the client/server package will enable his firm to handle customer production schedules more quickly by using a Windows-based PC client extension.

"I can plan both materials and capacity at the same time now, which I couldn't do before. I think we should be able to improve our business through quicker planning with this," Louka noted.

Anxious CA manufacturing customers will be able to put their arms around CA-CAS/Unix first because these products will enter beta this month and are expected to ship by September (see story below). Developed in two versions for commercial and aerospace/defense firms, CA-CAS/Unix is based on a three-tiered client/server architecture.

Desktop versions of the package will be Windows-based, while database and application server portions of the software have been designed to run on HP/UX, Hewlett-Packard Co.'s version of the Unix operating system.

Limited appeal?

Analysts said the CA-CAS/Unix and CA-PRMS client/server products are expected to satisfy the technical requirements of CA's manufacturing customers. However, the jury is still out on whether the new features will lure many first-time buyers because manufacturing industry users tend to remain loyal to their software vendors.

"CA-PRMS is good for their existing customer who is moving to client/server, but it won't be competitive in the marketplace until they come out with Oracle or Sybase versions," noted Clare Gillap, director of applications at International Data Corp. in Framingham, Mass.

Robert George, a senior industry analyst at Advanced Manufacturing Research, a Boston-based research firm, said CA will introduce Sybase, Inc. versions of CA-PRMS by year's end, followed by Oracle Corp. and Informix Software, Inc. versions by early 1995. Both CA-CAS/Unix and CA-PRMS now run on IBM's DB2 and CA's IDMS databases.

Wall Data, Inc. has introduced Rumba for the AS/400 Version 2.0 and Rumba for the Mainframe Version 4.0 connectivity software.

According to the Redmond, Wash., company, the products' user interfaces include a Windows NT SNA Server Interface providing direct access to mainframes and IBM AS/400s; a selective install feature that offers users customizing options at the interface, display and overview level; configurable menus; a floating tool bar; and TrueType fonts.

A single-user license fee for Rumba for the AS/400 Version 2.0 and Rumba for the Mainframe Version 4.0 costs $400.

▶*Wall Data*
(206) 883-4777

Generic Software, Inc. has introduced Release 5 of Save Output Queue for the IBM AS/400.

According to the Madison, Miss., company, the product is a spool file management system that lets users archive, retrieve, duplicate and delete spool files.

Enhancements include the ability to submit save requests to batch; on-line user interface manager help text for all Save Output Queue commands; and spool-file retrieval of files archived using Save Output Queue Release 3 or higher.

Save Output Queue Release 5 costs $499.

▶*Generic Software*
(601) 853-1189

Andersen Consulting joins Unix trend with Mac-Pac

By Ellis Booker

Earlier this month, Andersen Consulting joined the growing ranks of Unix true-believers among manufacturing software vendors by unveiling Mac-Pac Open, a Unix implementation of its integrated manufacturing, distribution and financial system.

The Chicago firm is the latest manufacturing software vendor to offer a Unix version of its core product.

At a recent user group meeting, Avalon Software, Inc. in Tucson previewed the next release of its Computer Interactive Integrated Manufacturing system, a client/server software product that uses Unix databases from Oracle Corp. or Sybase, Inc.

In January, Cambar Software in Charleston, S.C., announced Control II, a client/server implementation of its Control integrated distribution software system for distributors and manufacturers.

The ASK Group, Inc., a vendor of VAX-based manufacturing systems in Mountain View, Calif., recently began selling a Unix-based product, and Computer Associates International, Inc. is reworking its manufacturing line (see story above). Next month, System Software Associates, Inc. in Chicago will release a Unix version of its AS/400-based product.

"If you go down the list of vendors, virtually all have announced a Unix product or direction," said Tony Friscia, president of Advanced Manufacturing Research, Inc. in Boston.

Mac-Pac Open: *Andersen's flagship gets a Unix twist*

Friscia said that while the AS/400 midrange and IBM mainframe still predominate in manufacturing environments — Advanced Manufacturing Research numbers show close to 16,000 AS/400s and 7,000 mainframes running enterprise applications for manufacturers — all future growth is in Unix sales.

"Actually, Unix by itself is incidental" to manufacturers, Friscia said. Rather, they have come to see the benefits of distributed, open architectures to coordinate enterprisewide activities and shrink product cycle times.

Andersen Consulting's Mac-Pac Open works with Unix hardware from Hewlett-Packard Co., IBM and Sun Microsystems, Inc. and Unix relational databases from Oracle, Informix Software, Inc. and Sybase.

Mac-Pac, one of the first AS/400-based applications when it was introduced in 1988, has an installed base of about 1,000 sites worldwide, Andersen officials said.

Yet Andersen is not betting on moving most of these installed sites to Unix and will continue to sell its AS/400 product as part of the Mac-Pac Open line.

"Our customers seem to fall into two camps: those who are happy with the AS/400 and those who are oriented toward Unix," said product director James R. Brust.

According to Brust, manufacturers have been slow to adopt Unix because of a lack of stable and fully functional applications. But this market will see 25% growth by the end of the decade, compared with 10% to 12% growth for AS/400-based systems, Brust said.

Mac-Pac Open will be available in the second quarter. The product, which is written in C and C++, is based on Andersen's own Mach-II (Machine Independent Interface) execution architecture.

How to Unravel the Client/Server Mystique.

First, accept that there is no mystique. Rather, there are hordes of slightly frantic software companies content to have you believe that effective open system solutions remain elusive while they rush to understand, develop, and market their interpretation of client/server. Then there's Lawson Software.

An Open Systems Foundation

At Lawson Software, we've been committed to open systems since our company was founded in 1975. We've always believed that to be a valuable business partner, an applications provider must offer choices for business strategy development. So for us, client/server isn't a new phenomenon. Instead, it's the next logical step in our development. And it exists today – fully developed and fully functional – in the latest release of our enterprise-wide, cross-industry, world-class business application software.

A True Client/Server Solution

The truth is, client/server takes on a special meaning for each individual business computing environment. That's why we've structured our client/server solution as a comprehensive 3-tier architecture, delivering you maximum flexibility in hardware, database and user interface. It's why Lawson's products run across platforms like the AS/400 as well as UNIX systems such as the RS/6000 and HP9000. And it's also why we feature seamless support for a variety of leading databases. In short, we offer options that allow you to make the decisions. Based on your existing hardware configurations and your plans for future development, you choose to place the components of client/server where they will deliver the greatest value and performance.

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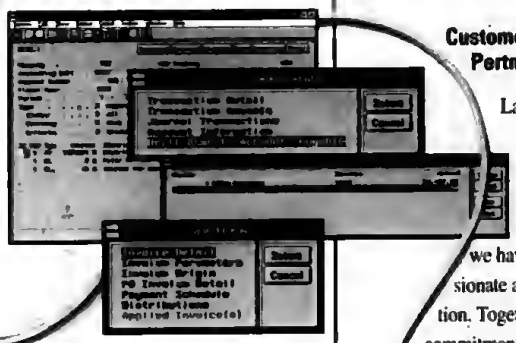

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Vendor promises puzzle users

By Melinda-Carol Ballou
SAN JOSE, CALIF.

Vendor hyperbole is taking its toll on developers, who complain that vendors are adding confusion to already complicated issues.

"Vendors go to great lengths to present the best possible picture" for how their products will match selected technical problems, and these pictures are typically biased to reflect their product's strengths, said Thomas Davidson, vice president of consulting and services at Rippe & Kingston Systems, Inc., an accounting and software consulting firm in Cincinnati. The difficulty is that the technical issues presented are entirely different depending on who you talk to, he added.

Davidson was among more than a dozen developers interviewed at the recent Software Development '94 show. Many said they are frustrated by vendor spiels.

Fair comparison?

Some developers cited Microsoft Corp. as an example of a company that skews information. The company included in its marketing materials a document titled "Object Strategies: How They Compare," which listed vendors, their object technologies and product features.

Not surprisingly, of 19 features listed as important, Microsoft's Object Linking and Embedding (OLE) includes 18 of them; the closest competitor, by Microsoft's reckoning, was Next Computer, Inc.'s NextStep, which offers 10 of the listed features.

IBM's Distributed System Object Model was credited with shipping only four of the 19 features, which IBM officials vociferously disputed when they saw the list.

For its part, IBM included in its marketing materials a comparison of Component Integration Laboratories' OpenDoc and OLE. Microsoft is writing a rebuttal to that piece.

Despite the technical bickering, products announced at the show will make object-oriented programming easier, according to some developers (see story at left).

Nearly all the developers queried used their time at the show to hone their skills in object-oriented development.

"We're migrating a C base of code to C++, and I'm here looking at advanced C++ and OLE. I'm trying to see how people use C++ in nonobvious, more com-

Promises, *page 62*

Help with objects

Corporate sites plan to implement a range of object technologies over the next two years, according to a survey of 291 developers conducted earlier this year*

TECHNOLOGY	PERCENT
C++	[illegible]
Class libraries	[illegible]
Object-oriented analysis and design tools	[illegible]
Portable GUI builders	[illegible]
Object development environments	[illegible]
Object-oriented frameworks	[illegible]
Object-oriented DBMS	[illegible]
Smalltalk	[illegible]
Distributed object management facility	[illegible]
Eiffel	[illegible]

*MULTIPLE RESPONSES ALLOWED

Source: Market Perspectives, Inc., Framingham, Mass.

Show highlights

Product announcements from vendors at the Software Development '94 show included the following:

▶**Watcom International**, now a subsidiary of **Powersoft Corp.**, announced a major version of Watcom C/C++ with a multiplatform graphical user interface development environment.

▶**Neuron Data, Inc.**, a software developer in Palo Alto, Calif., announced a new version of its SmartElements rule and object application development environment that incorporates support for C++. This will allow C++ users to embed business logic and processes into their object-oriented applications, company officials said.

▶**Mainsoft Corp.** in Mountain View, Calif., signed a license agreement with Microsoft that will enable Mainsoft to incorporate source code for current and future Windows technology into its cross-development tools. This combination of Windows source code with Mainsoft's MainWin kit offers a Windows application programming interface (API) for multiple computing environments.

It will allow Windows developers to provide their applications across Windows NT, Windows and Unix operating systems, according to company officials.

▶**Woodland Hills, Calif.-based Sterling Software, Inc.** released Answer:Zim 5.0, which lets developers create Windows applications that run in Windows, MS-DOS and Unix environments. It offers both graphical and text-based user interfaces.

—Melinda-Carol Ballou

Melissa Cook

Get back to basics

How do you re-engineer the enterprise information architecture when you never engineered it in the first place?

Face it, most companies really never engineered their systems architecture. It evolved. However, Darwin's theory of evolution may not apply here, and survival of the fittest does not seem to be working. A lot of exciting progress has been made, but many re-engineering development efforts have tiptoed around those legacy transaction processing systems that still run the core functions of large businesses.

In many cases these legacy systems are dinosaurs struggling to handle new business situations, but they are so complex that attempts to replace them have failed more than they have succeeded. Someone had it right when he called our field of expertise data processing. We have spent billions of dollars throwing technology at incompatible and redundant data

Cook, *page 63*

Start-up eases software integration

Mapping old data to new systems now simplified

By Melinda-Carol Ballou

■ Start-up New Paradigm Software Corp. recently introduced its first middleware software product, which lets developers integrate software running on heterogeneous platforms without additional programming, company officials said.

Dubbed Copernicus, the New York company's product lets systems and software communicate via a translator, which interprets system transactions and functions. As data enters the system, Copernicus' Universal Translator uses "methods" or "objects" — chunks of code stored in an internal database assigned to map to a specific task — to link disparate applications, company officials said. As new functions are added, the translator updates the system without rewriting the software program.

Because Copernicus' translator handles the disparities and communications between one application and another, no additional programming is required to link them, company officials said. Developers can use this to integrate legacy applications and data with new software, they added.

Pleased with performance

William Finley, president of Financial Performance Corp., is using Copernicus with Mars, his company's front-end profitability software that integrates data and services from different banking departments. He has already brought the software into pilot programs at three major banks and will add eight to 10 additional banks over the next few months, he said.

"You can tie all those different files together 10 times faster and 50 times cheaper using Copernicus [vs. traditional programming methods] because you can hook them together directly using [Copernicus'] methods," Finley said.

"Normally when you develop a custom interface or use [application programming interfaces], you have to have a debugging period and risk something going wrong. Using methods, you don't have to play around with the existing system; you can take an old system and hook it into the new without any problem," Finley said.

Another advantage of the Copernicus approach is reusability — the mapping objects are stored in the database so they are accessible for reuse, industry analysts said.

"It's a promising technology — mapping old data to new systems is always a major struggle, and they're providing a mechanism for doing that, which from the description is easy and straightforward," said Michael Goulde, an analyst at Patricia Seybold Group consulting firm in Boston.

"It's not that other companies haven't done mapping, but [Copernicus takes] a database-driven approach, which makes it easy to maintain, extend and reuse the mappings or methods" and incorporate business processes, Goulde said.

Copernicus is shipping now for the Unix 700 platform and Windows. It is priced between $25,000 to $100,000, depending on system configuration and number of users.

Vendor promises puzzle users

CONTINUED FROM PAGE 61

plicated ways," said David Olsen, software developer and owner of Berry Hill Software, a small shop in Port Townshend, Wash., that specializes in transportation software.

M. W. Heyn is a developer and consultant working with museums in Los Angeles to help them define their requirements for creating virtual reality kiosks using object-oriented analysis techniques. "I'm here to check out C++ and other object-oriented languages," Heyn said.

Lack of ability to coordinate client/server data across traditional relational database management systems and workstations with a range of other devices, such as measurement instruments, proved frustrating to a developer from The Boeing Co.

"We create all these beautiful and expensive CAD drawings," said Scott Sandwith, specialist engineer of operations technology at Boeing's Commercial Airplane Group in Seattle. However, when personnel in the field need to apply information from other devices, such as measurements for plane parts, to the computer-aided design (CAD) design, they are unable to incorporate that data, he said.

Sandwith spoke for the majority of those queried at the show when he said the advantages of bringing in client/server and object-oriented technology are ultimately worth the challenges.

"It's the future, and we have no choice but to dig in and learn everything we can," even though it is not always easy or possible to access the required information, he said.

Briefs

New interface offered

AutoTester, Inc., a Dallas vendor of software testing products, announced the release of an interface between KnowledgeWare, Inc.'s Application Development Workbench (ADW) computer-aided software engineering (CASE) tools and AutoTester Plus, an automated software testing tool.

This interface extracts definitions from screen maps generated by ADW and converts them into AutoTester Plus format. AutoTester Plus then generates test scripts that drive the application and determine whether or not the defined business function performs as expected by the software. AutoTester also offers interfaces to Texas Instruments, Inc.'s Information Engineering Facility CASE tools.

SunSoft ships tool set

SunSoft, Inc. announced it is shipping the Solaris Developer Solution Pak, a $895 bundled development tool set for Solaris x86 applications that run on Intel Corp. microprocessor-based machines.

Acquisition completed

Productivity tools vendor International Software Group International, Inc. in Waltham, Mass., completed the acquisition of Cortex Corp., developer of CorVision, a repository-based client/server application development tool.

Investing in Premier One

Premier One Consultants, Inc. in Minneapolis announced that a venture capital fund affiliated with Corinthian Corp. in Chicago has invested in Premier One.

Code converter offered

Four Seasons Software in Edison, N.J., announced a 4GL-to-C code converter as an add-on utility for its SuperNova development suite. The company said the tool converts SuperNova fourth-generation language (4GL) application code to C code, giving users more portable and more easily implemented applications. The converter costs $3,000.

Cook

CONTINUED FROM PAGE 61

and processes and created electronic labyrinths that even Super Mario would have trouble navigating.

How did we get into such a mess? If you look closely at a diagram of your system architecture, you are likely to see an embedded organization chart, each department with its own databases and applications. The problem is that the organization chart is inherently unstable, and many parts of the organization need similar data and perform similar processes.

We need to get back to basics. Your architecture should be component-oriented and built around data and processes and not the organization chart.

This approach also enables a clean transition to clients (processes) and servers (data) and can be implemented in any technology. Since data is inherently stable and processes are inherently unstable, start with the data. Many strategic redesign issues are also embedded in the data.

Databases should be designed around facts, not transactions. To design databases around facts, you must create a data model, a standard structure for all companies that the enterprise does business with, including suppliers, dealers and end users. They do not have to be in the same database, but the data must be compatible so you can identify companies that are suppliers and customers.

Can you link service contracts, orders, quotes, marketing inquires and warranty registrations for the same customer? If your business sponsors aren't asking for this data yet, wait until their competitors have it. Watch out for "never" statements like, "Our suppliers will never be our customers."

If you decouple your database structures from your processes and build them around a factual-based data model, it will allow new processes to be implemented more quickly.

Process-oriented

Software should be designed for a process, not a department. Perhaps your company sells simple products and complex products. You probably have two different ordering processes and may need two applications, one for simple products and one for complex products. You don't need separate order applications for the telesales department and the direct sales department.

Your users may not be happy with this. Some departments may end up using two pieces of software where they had one, but they will have software peaked for each process rather than a mega application four releases behind the current requirements for the department.

IS departments that have systems aligned with departments may fight this also. But this approach will also buffer you from reorganization and let you easily replace these smaller pieces of software where a process improvement has been identified by the business.

Technology will continue to make it easier to integrate multiple applications or clients into a user environment. Draw a reasonably firm line around the processes that will be automated and resist the urge to tack on major new processes.

Regular updates

Unlike data, processes are unstable and you want to quickly replace software with a better process or technology. For the first time, you will be able to complete an application's functionality in one or two releases, let it do its job for a few years then replace the whole thing quickly with new technology or a new business definition of the process.

Separation of data and processes moves toward defining your architecture as a set of databases that can evolve to servers and processes that evolve into application clients. It lets you take advantage of computing power where you need it, processing the transaction on the desktop or serving data to the transaction.

It's important to note that these engineering principles enable, but do not require, a move to client/server or object-oriented technology.

So dust off those data modeling and data dictionary training materials. Make sure you understand what processes you are automating, not which department.

Cook is the corporate marketing information architecture manager at Hewlett-Packard Co.

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BY KEVIN BURDEN

Free money!

IS managers at nonprofit organizations can fund their pet projects with government and private grants. But you have to know how to play the game

David E. Garets has just started what promises to be a long and arduous journey.

As chief information officer at Magic Valley Regional Medical Center in Twin Falls, Idaho, Garets is heading a consortium of hospitals that is attempting to improve health care for southern Idaho and northern Nevada.

The Idaho Medical Information Consortium is developing a prototype rural hospital system. Its goal is to integrate the information systems of five area hospitals and approximately 200 independent physicians and to give them access to a common patient medical history database.

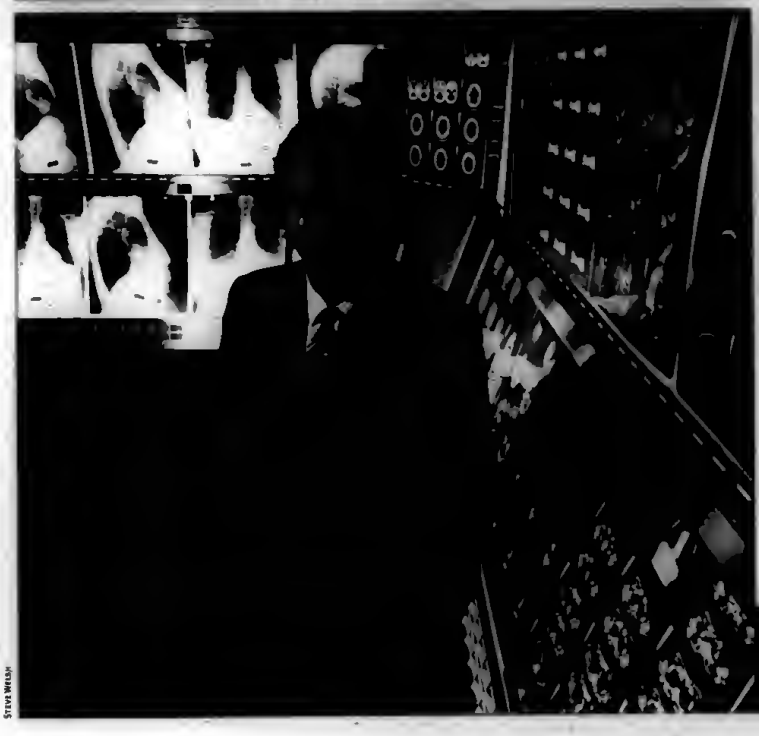
The estimated price tag of roughly $4.5 million is clearly out of the reach of the consortium's IS budgets, so consortium members are looking for outside help from government grants and private philanthropies.

There are literally thousands of grant providers willing to throw money at projects that fit their funding guidelines, and a sizable slice of funds goes toward computer hardware and software.

However, providers are not on a mission to computerize nonprofit organizations. Because computers are now commonplace and technology becomes outdated so quickly, grant providers are reluctant to fund equipment, says Andrew Grant, director of grants at Baruch College in New York.

Grant givers are looking for bids that match their aims and criteria, and grant-winning IS organizations

Free money, *page 66*



Health care CIO David E. Garets

STEVE WELSH

Free money

CONTINUED FROM PAGE 65

know this. If you want to bring home the bacon, you have to do your homework to find the right philanthropies and agencies and then learn to speak their language.

Doing your homework

One of the hardest parts of any grant application process is knowing where to turn for funding, experts say.

There are approximately 22,000 private grant foundations in the U.S., and while there are fewer federal agencies, their complex bureaucracies can make them appear just as numerous. Some of the differences between them are subtle; others are substantial. Applicants must be prepared to adjust themselves accordingly.

Perhaps the most significant difference is that the funding interests of federal programs are dictated by legislative mandates. It's easy to see why many applicants get discouraged: The application forms are often the size of an epic novel and the institutions are heavily bureaucratic.

Private foundations are usually far more restrictive. Applicants are typically limited to a geographic region, and each foundation has its own notion of what constitutes a "politically correct" project worthy of funding.

The purpose of public foundations, like that of federal sources, is typically to advance a particular interest. But unlike their federal counterparts, these organizations' governing boards are not legally restrained from deviating from their main stage activity. For instance, many private organizations ignored their prime directives and contributed funds to the American Red Cross for disaster relief for the Los Angeles earthquake and the flood in the Midwest.

Eligibility requirements not only differ for each foundation, but they also differ within each foundation's various programs.

Cost-sharing percentages also vary, and some foundations deposit a lump sum into an account while others pay only in reimbursement installments.

Making a match

No matter which path you choose, applying to providers whose funding priorities match your project is the best way to increase your chances.

Fully researching each grant maker to be sure it can satisfy your funding needs is just as important as targeting foundations whose records of giving closely relate to your project.

Applicants can follow all instructions of the funder, communicate their proposal in precise, clear language and have an impressive track record of project completion. But nothing will increase the chances of success if you apply to the wrong sources.

"There are many worthwhile projects that must be declined because so many organizations are pursuing limited dollars," Graot explains. "Poorly written proposals simply make it easier for funders to reject the request."

Finding the right provider involves a lot of painstaking but necessary research. However, applying to grant givers whose interests don't match your own will only waste time and money. Although there is never an application fee to submit a grant proposal, the time wasted on proposal preparation makes it a money-losing proposition.

If you've done all of the above and are still turned down, don't be discouraged. Find out why the proposal was not considered and make changes accordingly. Chances are that your proposal may meet with success somewhere else or even with the same foundation the next year. And it may be that your proposal was strong, but someone else's — such as the grant winners on page 70 — was just better.

The Detroit area libraries

One grant-winning organization that knows how to prepare applications and check out funding sources is the Detroit Public Library, which sought grants to become automated.

The library received the bulk of its $4.7 million in project costs from a variety of private foundations as well as from federal funds from the U.S. Department of Education.

The Detroit Area Library Network automation project is networking the city's main library with 25 branch libraries. The system uses an existing mainframe at the host library at Wayne State University.

However, the library needed help financing the terminals, telecom equipment, printers, bar-code scanners and cabling, according to Helen Ma, automation coordinator.

"The budget that paid for all the automation equipment, every single dollar, came from special funding and grants. Not one single dollar came from our operating budget," Ma says.

When the decision was made in 1988 to pursue the automation project, research and grants coordinator James W. Lawrence immediately began identifying potential funding sources. Knowing the project was too large to be funded by a single sponsor, the library applied to

Free money, *page 70*

This just in from the techno-grant front . . .

The National Telecommunications and Information Administration has announced a **$26 million grant program** to fund projects associated with the advancement and delivery of advanced telecommunications technologies. All nonprofit public and social services are candidates for funding.

The program is looking for projects designed to enhance the delivery of social services, promote access to government information and promote the advancement of an improved nationwide information infrastructure.

Applications must be received by May 12, 1994. Recipients will be required to provide 50% of the total project cost. Joint applications from partnerships will be looked on favorably.

For more information, contact Charles M. Rush, acting director at the Office of Telecommunications and Information Applications, 14th St. and Constitution Ave., NW, Room H-4889, Washington, D.C. 20230, (202) 482-2048.

Program details can also be accessed via the Internet.
FTP to: *ftp.ntia.doc.gov*. Log on as *anonymous*; use your E-mail address or *guest* as the password. The file name is *niiagenda.asc*.

Finding funds

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That's why PeopleSoft client/server financial and human resource applications are the choice of 322 companies, worldwide. (As of January 1994.) With more signing up every day. Get the facts from our new white paper: *Client/Server Business Solutions*. For your free copy, and a schedule of our client/server seminars, please call 800/947-7753.

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Free money

CONTINUED FROM PAGE 66

more than 55 foundations and the philanthropic arm of 45 corporations.

"We had our best luck with foundations right in the Detroit area," Lawrence says. "Many [foundations] we applied to outside Detroit said their funds had previously been committed."

Number of proposals submitted:	90
Number of grants received:	80
Success rate:	88%
Average number of proposals written per year:	10

Making it personal

Library Director Jean Curtis presented the project plans in person to several of the more promising agencies to increase the proposal's visibility. She was able to learn what each agency considered an eligible project so that the library could customize its proposal — a key step.

For example, the Skillman Foundation in Detroit, which awarded Detroit's library automation project $1 million, concentrates many of its grants in the areas of education and child welfare. Not surprisingly, the project's objective statement in its Skillman proposal stressed the benefit to the area schools.

"Because the schools depend a lot on the public library and this system would allow schools to connect remotely, we were able to make a good argument on how the system would benefit education," Lawrence says.

An important detail in applying for this grant was naming not the library itself but its nonprofit fund-raising wing, The Friends of the Detroit Public Library, as the grant recipient. Even though the library is nonprofit, it is ineligible for assistance from many foundations simply because it is a branch of city government.

Knowing what to address

By knowing ahead of time what criteria would be used in judging its grant applications, the library was able to address those points up front in the various proposals. The main criteria included the following:

• **Cooperative partnering:** The Detroit Public Library worked closely with the libraries at Wayne State University, the University of Detroit Mercy and Oakland University at Rochester Hill, Mich., which were also looking for automation grants. Although each library applied for grants separately, they played an active part in one another's proposals, stressing how the libraries would eventually be networked to share resources.

• **Benefit to the community or a show of community support:** The library received $12,000 from public donations. Patrons were able to contribute to the program through drop-off boxes at the branches and by way of brochures with tear-off mail-ins. Corporations lining up for sponsorship included Detroit heavyweights such as the Chrysler Corp. Fund, Ford Motor Co. Fund, Detroit Edison Foundation, Comerica Bank and ANR Pipeline Co. Together they donated a total of $111,000 to the project.

• **Grant track record:** As an old institution, the library was able to document a long history of grant-sponsored projects. And because funders like to see with whom they will be keeping company, the library kept all foundations that had not yet reached a decision abreast of the awards that were already received.

• **Life after funding:** The proposal assured contributors that the funding was for a onetime start-up cost. Through annual reports, the library was able to convince funders that its operating budget could handle any long-term maintenance costs.

The MedConnect project

The library at the National Jewish Center for Immunology and Respiratory Medicine in Denver also applied for a technology grant to automate its library system.

Because its project was much smaller in scope than the Detroit Public Library project, the National Jewish Center was able to obtain the $220,000 it needed from a single federal source, the National Library of Medicine, a department of the National Institutes of Health.

The consortium, headed by the National Jewish Center library, is connecting seven medical libraries to the Colorado Alliance of Research Libraries, an automated integrated library system. The grant, which was awarded over a two-year period, will pay for all the terminals, connection equipment and the process by which the books are cataloged — essentially everything but personnel and building renovations.

Again, the key to success was a strong proposal with help from the federal agency targeted for the grant. The National Library of Medicine assigned a grant administrator to work with the center and help with its proposal.

Rosalind Dudden, the health science librarian and principal investigator for the MedConnect project, said the assigned administrator proofread and commented on several drafts before completing the final 113-page proposal.

"She also had sent us copies of three successful grant proposals which were similar in scope to our project," Dudden says.

The MedConnect proposal was approved for funding five months after it was first submitted. It took another seven months before the money actually became available.

Knowing the guidelines

As with the Detroit Public Library, the National Jewish Center did its homework on what criteria would be used to judge its application and addressed the same basic guidelines:

• **Cooperative partnering:** The National Jewish Center brought together seven health science libraries in Colorado that jointly applied for the grant and will work together to connect to the Colorado Alliance of Research Libraries system.

• **Project commitment:** The National Library of Medicine required that project group members prove their commitment by sharing the cost of the project. The consortium contributed $446,000, which went toward the cost of personnel, office renovations to accommodate new equipment and the cost of cataloging books.

• **Benefit to the community or a show of community support:** Because each participating library has concentrated resources on a particular medical speci-

Detroit Public Library

the information place.

Project: Automate and network main library and 25 branch libraries

Year project and fund-raising began: 1988

Status: All necessary funding has been received. The final two branch libraries will be connected by June.

Applied to: 55-foundations and 45 corporations

NUMBER OF GRANTS AND AWARDS RECEIVED

Total of all grants and awards $4.5 million.

Matching funds: The Detroit Public Library contributed $266,000 toward personnel, space allocation, wiring, administrative costs and security measures.

MedConnect

Medical Library Connection

Library project for the National Jewish Center for immunology and respiration medicine in Denver.

Project: Automate and connect seven medical libraries to the Colorado Alliance of Research Libraries network.

Status: Received grant and completed first year of project in January. Full project will be completed by the end of the year.

Grant: One federal grant totaling $220,000 over two years from the National Library of Medicine.

GRANT TIMETABLE

Proposal submitted:	[redacted]
Approved for funding:	[redacted]
Notified of funding:	[redacted]
Funds available for use:	[redacted]

Matching funds: MedConnect contributed $466,000 toward personnel and building space.

Magic Valley Regional Medical Center

Project: Develop a regional health care network by networking five hospitals, approximately 200 physicians and other public health facilities in southern Idaho and northern Nevada.

Estimated cost of project: $4.5 million.

Matching funds: Expect to raise roughly half the total project cost.

ality, the Colorado libraries system stands to broaden its medical resources.

• **Grant track record:** The participating libraries had not only a list of past grant projects but also a history of past cooperative projects.

• **Life after funding:** The top administrators at each of the seven health science libraries attached letters to the proposal expressing their commitment to the project and guaranteeing to include the annual $10,000 cost of using the system in the hospital operating budgets.

The libraries are currently in their second year of funding and will complete the project by year's end.

Final advice

Here are a few final points to keep in mind while writing your proposal. Be realistic and don't promise what can't be delivered. Be very specific — communicate exactly what your project is and precisely what you need. Show wide benefit for your grant proposal. Submit a detailed budget and be able to substantiate all the figures — leave the guesswork out. Do not encase the proposal in plastic or in a binder, the funders will need to make copies, so make it easy for them. And use layman's language — do not fill the proposal with abbreviations and acronyms. After all — foundations certainly won't fund what they can't understand. ■

Putting their best foot forward

Experts say philanthropists look for certain key elements in every application. These elements are present in the bid by David E. Garets, chief information officer at Magic Valley Regional Medical Center in Twin Falls, Idaho, and officials from other hospitals in their efforts to build a rural health care system for southern Idaho and northern Nevada.

An attention-getting project: Grant providers look for projects that will not only maximize the use of the grant but will also get them noticed. They want their funds to be the instrument of social change. This is especially true of private foundations. While there may be similar health care systems currently in place, none are as large as the planned Idaho project.

Cooperative partnering: Funders are more likely to finance projects that involve several organizations working together rather than a single company moving on its own. The once loosely connected group of hospitals and physicians are cooperating and are committed to this information integration project to improve the delivery of health care to the community.

Project commitment: Funders are looking for applicants to prove their commitment to the project, usually in the form of matching funds. All of the hospitals and participating independent physicians will be sharing in system costs by putting up money from their own budgets. The consortium expects to foot at least half the bill.

Benefit to the community or a show of community support: Projects supported by the community that they intend to benefit get noticed. The Idaho Medical Information Consortium, a group formed out of a statewide meeting sponsored by the governor of Idaho and the state legislators, officially designated its rural health care system as the test bed in Idaho for a computerized patient record system.

Grant track record: Grant providers are more comfortable funding organizations that can document successful grant projects. None of the participating hospitals have ever sought or received a grant this large, but they can document several successful small grant projects.

Life after funding: Funders need – and sometimes require – assurance that the project will remain in force once the grant money runs out. The support of the Idaho state government works strongly in favor of the project.

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70 Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT

80 Educator, Journalists, Librarians, Students
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Calendar

Computer Museum hosts Internet auction

In a high-tech twist on the charity auction, The Computer Museum in Boston will host "The First Internet Auction" April 22-29 to support its educational programs.

The auction, the first of its kind, will be conducted entirely through electronic mail on the Internet.

More than 60 items will be on the auction block, ranging from Cardiac, a cardboard computer developed at Bell Labs (bidding begins at $5), to an Ethernet Sniffer network analyzer from Smart Valley's Harry Saal and Network General Corp. (bids start at $3,000). Many of the items up for bid are vintage components or documents of technologies from which the Internet has evolved.

Among the entertainment items up for bid will be the opportunity to spend an evening playing Space Wars, the "mother" of all computer games. And Microsoft Corp. Chairman Bill Gates will provide the entertainment selection he would want with him if he were stranded on a desert island — with electricity. (No one will say what that is in advance.)

The auction is open to anyone who sends E-mail to auction-info@auction.tcm.org. A computer server will function as the "auctioneer," and anyone who submits a bid becomes a participant.

Those who want to bid without the benefit of E-mail can call (617) 426-2800, ext. 322.

Bidding begins at 10 a.m. EST. The auction continues round-the-clock until the last items close on April 29 at 8 p.m. For more information, call (415) 323-1909, or send E-mail to auction-info@auction.tcm.org.

APRIL 3-9

EDI 2000. Chicago, April 5-6 — Keynotes: Jack Shaw, president, EDI Strategies, Inc., and Don Fuqua, president, Aerospace Industries Association. Contact: EDI 2000, Dallas, Texas (214) 475-1838.

Rocky Mountain Telecommunications Exposition. Denver, April 5-6 — Theme: "Where Communications and Opportunity Meet." Contact: Sheri Prom, Tele-Communications Association, Denver, Colo. (303) 860-6125.

The Annual Computer Storage Exposition & Conference. San Francisco, April 5-7 — Focus: The integration of the mobile office into networked systems and associated issues and products that deal with hierarchical storage management, system archiving and backup. Contact: Sandi Eberhard, Eberhard & Co., New York, N.Y. (212) 486-6186.

The Virtual Reality Forum 1994. New York, April 5-7 — Contact: Virtual Reality Systems, New York, N.Y. (212) 861-0588.

15th Annual Conference on IS Performance/Capacity Management. Phoenix, April 5-8 — Theme: "Economics of the New IS Environment," including topics such as the new economics, financial management, sizing strategies and issues, controlling IS costs, performance/capacity issues and benchmarketing. Contact: The Institute for Computer Capacity Management, Phoenix, Ariz. (602) 997-7374.

Midwest Graphics '94. Detroit, April 7-9 — Contact: Graphic Arts Show Co., Reston, Va. (703) 264-7200.

APRIL 10-16

Association of Banyan Users International, Inc. (ABUI) Spring '94 Conference & Exposition. Atlanta, April 10 — Keynotes: "Building and Integrating Applications Using a Messaging Infrastructure" by David Whitten, Office of Information Systems, Gartner Group, Inc.; "Reflections on the Future of Enterprise Networking and Messaging" by David C. Mahoney, CEO, chairman of the board, Banyan Systems, Inc. Contact: ABUI headquarters, Chicago, Ill. (312) 644-6610.

1994 KnowledgeWare International User Conference. Atlanta, April 10-13 — Contact: KnowledgeWare, Inc., Atlanta, Ga. (404) 231-8575.

Crossroads '94. Rancho Mirage, Calif., April 10-13 — Focus: Interpersonal networking for senior executives — users and vendors — involved in open client/server computing. Contact: Open Systems Advisors, Boston, Mass. (617) 859-0859.

NetWare User Conference. Providence, R.I., April 11-12 — Contact: Providence NetWare User Conference, Orem, Utah (800) 755-9898.

1994 National Association of State Information Resource Executives Midyear Summit. Boston, April 11-13 — Contact: NASIRE, (606) 231-1905.

Managing Customer Service. Phoenix, April 11-13 — Focus: What is involved in supporting management procedures, work load descriptions and service-level contracts. Contact: The Institute for Computer Capacity Management, Inc., Phoenix, Ariz. (602) 997-7374.

IPC '94 Conference & Exposition. Detroit, April 11-14 — Theme: "People, Partnerships and Technology." Contact: The Engineering Society, Ann Arbor, Mich. (313) 995-4440.

The Sixth Annual National Managed Health Care Congress. Washington, April 11-14 — Theme: "Realizing the Promise of Managed Care: Using Reform to Revitalize." Contact: The National Managed Health Care Congress, Waltham, Mass. (617) 487-6700.

Marketing the IS Organization Internally. Philadelphia, April 12 — Contact: Ouelette & Associates, Bedford, N.H. (603) 623-7373.

Global Environmental Excellence Conference. New York, April 12-13 — Focus: Senior executives seeking pragmatic ways to deal with tough environmental, health and safety issues. Keynote: Robert H. Campbell, chairman and CEO of Sun Co. Contact: Carol Courter, The Conference Board, New York, N.Y. (212) 759-0900.

1994 International Conference & Exhibition on Multichip Modules. Denver, April 13-15 — Sponsors: The Microelectronics Society, The International Electronic Packaging Society, The Electronic Industries Association and Components, Packaging, Manufacturing Technology Society. Contact: International Conference & Exhibition on Multichip Modules, Reston, Va. (703) 758-1060.

International Multimedia Conference. Salt Lake City, April 13-15 — Contact: Steve Cantwell, Allen Communications, Inc., Salt Lake City, Utah (801) 537-7800.

International Wireless Communications Expo. Las Vegas, April 13-15 — Focus: Cellular, paging, specialized mobile radio. Contact: *Communications Magazine*, Englewood, Colo. (303) 220-0600.

InterGrowth 1994. Scottsdale, Ariz., April 13-16 — Focus: "Acquisitions and Divestitures — Delivering Corporate Growth and Renewal." Contact: Carl Wangman, Association for Corporate Growth, Glenville, Ill. (708) 699-1331.

Industry Futures Conference. Boston, April 14-15 — Focus: Gartner Group, Inc. analysts will present their views regarding the changing information technology landscape through the year 2000. They will explore communications, software and processes, with heavy emphasis on the future plans and potential survival of today's information technology vendors. Contact: Gartner Group, Stamford, Conn. (203) 964-0096.

APRIL 17-23

SHARE Spring 1994 Meeting. St. Louis, April 17-20 — Contact: SHARE, Chicago, Ill. (312) 822-0932.

Accounting and Cost Allocation for Client/Server Systems. Toronto, April 18-20 — Contact: Technology Transfer Institute, Santa Monica, Calif. (310) 394-8305.

Distributed Computing World. Washington, April 18-21 — Focus: There will be four separate conferences designed for companies in the process of implementing distributed systems. Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Electronic Messaging '94. Anaheim, Calif., April 18-21 — Focus: E-mail. Contact: Electronic Mail Association, Alexandria, Va. (703) 524-5550.

ISCA '94: 21st International Symposium on Computer Architecture. Chicago, April 18-21 — Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

Unix Reseller Conference. Dallas, April 18-21 — Keynotes: Charles B. Wang, CEO of Computer Associates International, Inc. and Phillip E. White, CEO of Informix Software, Inc. Contact: Expoconsul International, Inc., Princeton, N.J. (609) 987-9400.

Distribution/Computer Expo '94 & Seminar '94. Rosemont, Ill., April 19-20 — Focus: Electronic data interchange, warehousing, transportation management, logistics, bar-code technology, distribution and industry trends. Contact: C. S. Report, Uwchland, Pa. (610) 458-6410.

Client/Server Developers' Conference. Washington, April 19-21 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Networks Expo. San Francisco, April 19-21 — Focus: Networking and computing. Contact: Annie Scully, Bruno Blenheim, Inc., Fort Lee, N.J. (201) 346-1400.

Re-engineering: The Implementation Perspective. Boston, April 19-21 — A seminar providing an introduction to the concepts and objectives of re-engineering with an analysis of the business factors driving it. Instructor: Michael Hammer of The Center for Re-engineering Leadership. Contact: Hammer and Co., Cambridge, Mass. (617) 354-5555.

The Third International Conference on Software Methods. Boston, April 19-21 — Theme: Keeping methods turned to technology. In addition to keynote talks, the conference features numerous two-track sessions including: Software Development with Agents, Effective Technology Transfer, Reusing Products of Analysis, Client/Server Rapid Application Development and Methods for More Usable Software. Sponsors: Technology Transfer Institute and The Atlantic Systems Guild. Contact: Technology Transfer Institute, Santa Monica, Calif. (310) 394-8305.

1994 Society for Information Management (SIM) Institutional Member Conference. Ponte Verdra, Fla., April 19-22 — Contact: SIM, Chicago, Ill. (312) 644-6610.

Seventh Annual Intermac Users Group Education Symposium. Toronto, April 20 — Focus: The three-day event will help users understand the world of bar-code data collection and how to apply practical solutions that will help improve productivity and reduce operating costs in any business. Contact: Kimberly Lombard, Intermac Corp., Everett, Wash. (206) 348-2600.

The First Internet Auction. Boston, April 22-29 — Contact: The Computer Museum, Boston, Mass. (617) 426-2800, ext. 341/329.

APRIL 24-30

CHI (Computer Human Interaction) '94: ACM Conference. Boston, April 24-28 — Focus: "Human Factors in Computer Systems." Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

VIP '94. San Antonio, April 24-28 — Legent Corp.'s annual users' conference. Open to all users of Legent products; designed for managers and professionals at all levels. Contact: Legent Corp., Herndon, Va. (703) 708-3000.

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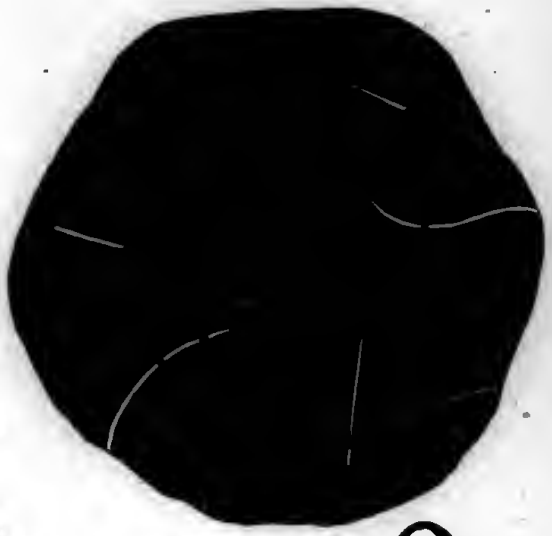
COST, COVERAGE AND CONVENIENCE ARE STILL MAJOR HOLES TO WIRELESS DATA COMMUNICATIONS. WIDE USAGE WON'T OCCUR UNTIL DECADE'S END.



when wireless?

BY JOE PANEPINTO

Sure, two-way wireless data communications is here today — if you're intrepid, have vast resources and are able to lay out big bucks to get some needed competitive edge.

United Parcel Service, Inc. is a case in point. UPS spent six years and $1.5 billion investigating and implementing wireless communications before settling on circuit-switched cellular, according to International Data Corp. Since Federal Express Corp. had gotten the jump in real-time package tracking and mobile data communications, it was do or die.

But UPS had to fight some wireless battles that may be too daunting for smaller firms. For example, to get cellular coverage for the Top 100 U.S. markets, UPS had to negotiate with 23 vendors (and 23 different rate structures, billing increments and billing systems). Today, UPS, and only UPS, has a consolidated billing arrangement with those vendors under which it receives a single bill and makes a single remittance each month.

UPS says wireless will pay for itself in new business and customer retention. This is true of most early adopters of wireless, including the transportation industry and field service.

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INSIDE INSIDE

WIRELESS IS STILL OUT OF REACH FOR MOST COMPANIES

CONTINUED FROM PAGE 75

But the big question is, what will it take for the baton to pass to companies that don't have their feet to the competitive fire?

Wireless "is too expensive, coverage is not broad enough, the applications are not there, the batteries don't last long enough and the equipment is too large and clunky," says Dick Schaffer, a principal at Technologic Partners in New York. "Other than that, [wireless] technology is great."

Schaffer may be engaging in a little hyperbole. But, there is certainly more than a grain of truth to every criticism he has of the wireless data communications market and its limited acceptance across horizontal markets.

At the same time, each of his on-target criticisms is being addressed aggressively by a variety of vendors hoping to establish themselves in this still-maturing market. The race is on to make wireless data commnnications less expensive and more ubiquitous, useful, integrated and convenient.

WIRELESS HURDLES

What are the most significant barriers to wireless?

Too expensive	38%
Lack of applications	14%
Incompatible offerings	10%
Poor ease of use	10%
No need for it	10%
Short battery life	7%
Lack of coverage	3%
Lack of speed	3%
Lack of safety	3%

Response base: 78

Source: Buyers Satisfaction Scorecard

Cost

Currently, the overall cost of equipping the nomadic work force touted in marketing literature is still prohibitive.

Most head-to-head cost comparisons of wireless data transmission focus on cost-per-minute or circuit time (for circuit-switched cellular); or per-packet costs (for packet radio from companies such as ARDIS and RAM Mobile Data). But when it comes to

WIRELESS CHOICES

GENERAL DESCRIPTION	STATUS	PROVIDERS	APPLICATIONS	COVERAGE
Two-way radio frequency-based wireless messaging service. Similar to wired packet-switching networks.	The most broadly accepted wireless transmission method.	RAM Mobile Data, ARDIS.	Field services, transportation, public safety; expanding into E-mail through agreements with integrators, VARs.	90% of urban U.S. businesses (RAM Mobile Data); 80% of U.S. population (ARDIS)
Uses existing cellular voice networks. Mobile users can plug portable fax machines into their cellular phones or attach a notebook via specialized cellular modems.	Available in nearly all cellular markets but has severe technical flaws that make it unreliable.	All cellular operators.	Files and faxes served on a secondary basis.	95% of population.
Delivers data over existing cellular networks at 19.2K bit/sec. by converting data to digital packets. Uses channel hopping or dedicated channel to make use of existing frequency allocation.	In deployment.	All RBOCs; McCaw Cellular, Bell Atlantic, GTE, Ameritech, Nynex and PacTel are significant players.	Short, bursty traffic such as credit-card transactions.	Today: 5% of population. Mid-1995: 75% of population.
Low-cost, easy-to-use, one-way data messaging and broadcast technology relying on small message transmission.	Mature.	Embarc (a Motorola company), SkyTel (a subsidiary of Mobile Telecommunications Technologies, or MTel).	SkyTel – executive pager, centralized messaging, 240-char. limit. Embarc – file transmissions, 30,000-char. limit.	90% of the nation; primarily urban coverage.
Radio technology based on large numbers of low-power microcells. The ubiquity of microcells will require minimal battery power in end-user devices and thus may allow for more miniaturization.	Embryonic. Expected to be launched in late 1995. The FCC has planned an auction for spectrum in the 2-GHz range that would support up to seven PCSs in each metropolitan area.	National Wireless Network (an MTel company).	Two-way data messaging (up to 2K-byte message size).	Nationwide; 300 markets by June 1995.
Development of existing SMR infrastructure using digital technology that allows voice, data, short message and paging. Motorola provides ESMR equipment called Motorola Integrated Radio System.	Being deployed. Some limited services available by year's end from Nextel.	Nextel, CenCall, DialPage.	Voice, short message, data, paging.	Licensed for 90% of U.S.

justifying the acquisition, installation and maintenance of a wireless data communications system, analysts say this usage expense — which averages roughly $80 per user per month — is just the tip of the iceberg.

Besides, as the market grows, on-line and per-packet costs will continue to drop to roughly $35 per user per month by 1998, according to Iain Gillott, research manager at Link Resources, Inc., a market research firm in New York.

More important cost barriers include the up-front costs of equipping all mobile employees with some kind of handheld, laptop or other portable device (roughly $1,500 to $4,000), as well as the cost of specialized wireless modems ($750 to $1,000 per modem).

The lack of standardization and interoperability among transmission systems complicates the cost picture. Currently, every major wireless service provider supports a different wireless standard, requiring a different wireless modem for each network. Since no single technology offers complete coverage, it's either live with the dead spots or carry multiple modems.

Even if the modems have the credit-card-size PCMCIA form factor (easing the bulkiness issue), the price is still too high. When PCMCIA modems begin to ship from multiple vendors around midyear, they are not expected to be much cheaper than non-PCMCIA modems.

"My members really want modems with multiple functions," says Gene Hengel, director of strategic technologies at Insurance Value-Added Network Services (IVANS). IVANS is field-testing Cellular Digital Packet Data (CDPD) on McCaw Cellular Communications, Inc.'s AirData network in Las Vegas. "If you're carrying around a $3,000 laptop and have to carry around another $4,000 worth of modems, it doesn't make any sense," Hengel says.

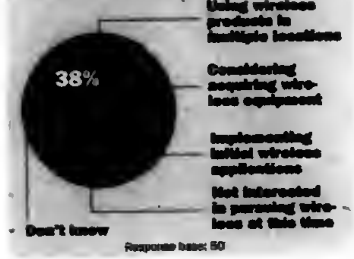
IVANS is beta-testing $1,500 IBM ThinkPad 750s that sport integrated multifunction modems from San Diego-based Pacific Communication Sciences, Inc. (PCSI). The modems (marketed by PCSI as Ubiquity 2000 and by IBM as Mobile Communication Modules) support not only CDPD and switched-cellular data communications but also cellular voice, cellular fax, wire-line data (plugging into standard telephone lines) and wire-line voice.

Other wireless modem vendors have not yet promised multifunction modems, but analysts say consumers can expect announcements before year's end from such

Wireless, *page 78*

WORKING WIRELESS?

What is your company's position on wireless technology?



Source: Buyers' Satisfaction Scorecard

wireless lans

WHAT'S HOT

PROXIM'S RANGELAN2

A dozen or so wireless LAN vendors exist today, including significant communications players such as **AT&T GLOBAL INFORMATION SOLUTIONS** (formerly NCR Corp.) and **MOTOROLA, INC.**; former defense/military contract suppliers such as **PROXIM**; and LAN players such as **BICC**.

The market lacks formal standards, with competing systems based on radio frequency and infrared; however, an IEEE committee is working on standardization. Many companies are represented on the committee, including **DIGITAL EQUIPMENT CORP.** and **XIRCOM, INC.** Yet another company, **AIRONET**, announced its support for the 802.11 standard recently. Another key player is **WINDATA**.

XIRCOM and **DYNA COMMUNICATIONS** have announced a joint development and cross-licensing alliance they say will deliver mobile connectivity and network printing products for the **APPLE COMPUTER, INC.** market.

MICROCOM, INC. is now shipping LANexpress, an integrated system for connecting individual and remote users to corporate LANs. The product combines Windows-based client software with a high-performance server that comes standard with up to eight integrated 28.8K bit/sec. V.fast modems. It is available in both Ethernet and Token Ring versions.

— Anne Lynch

TWO-WAY MESSAGING AND LOWER-COST TRANSMISSION ARE CHANGING THE MARKET

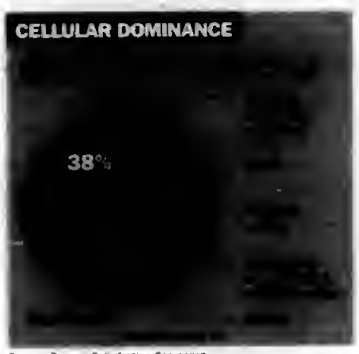
NUMBER OF USERS	COST	MODEM COSTS	USER SERVICE FEES	DOWNSIDE	NOTES
RAM: will not disclose. ARDIS: 35,000 (more than half are IBM, Motorola employees).	Recent pricing changes make it much cheaper than circuit-switched cellular.	$650 to $795.	Average $50/month plus kilopacket charges.	Reliability in densely packed downtown areas is still an issue.	RAM and ARDIS are backed by significant players. Both are aggressively upgrading their networks to 19.2K bit/sec., improving coverage and planning to connect to many other network types.
Difficult to track; carriers can't distinguish between voice and data use.	Expensive. User pays for use of entire circuit and incurs new call charges when a circuit is dropped and data re-sent.	Average, $500; can be subsidized.	Average, $35/month plus airtime charges.	Inherent unreliability. Fax works satisfactorily, but RF transmissions aren't accepted by host applications.	Cellular carriers are under increased pressure as other players — CDPD and PCS — enter the marketplace.
No users other than those in trial mode.	Unknown.	$495 to 1,595. Expected to decrease to $200 once CDPD catches on.	Kilopacket charges; expect promotional and tiered pricing.	Doesn't exist today.	CDPD has clear advantages over current alternatives. Its role may become more limited as digital cellular networks are built and additional RF spectrum is made available.
16.2 million business users use paging but not necessarily for messaging.	Low cost.	$200 to $300.	$35 to $50 per month.	Current attention is on CDPD and two-way messaging.	Embarc and Skytel are currently lobbying the FCC for additional spectrum allocation that could support two-way messaging.
None.	Providers expect it to be the most inexpensive two-way wireless network.	$200 to $300.	NA	MCI Communications Corp. turned its sights from PCS to ESMR with a $1.3 billion investment in Nextel Communications, Inc.	Holds promise of being cheap and very user-friendly but is embryonic. National Wireless Network has a good head start, with "pioneer's preference" authority from the FCC to build a national two-way data network using narrowband. It claims that its construction costs are $100 million, a fifth the investment required for packet radio networks.
SMR users number in low hundreds.	Expected to provide cellular quality and service for low price.	NA	$35 to $50 per month.	Taking on a big competitor, as cellular has large installed base.	With MCI interest in ESMR, Nextel will have access to MCI's subscriber base.

WIRELESS

CONTINUED FROM PAGE 77

heavyweights as AT&T, Motorola, Inc., Ericsson GE Mobile Communications, Inc. and Rockwell International Corp. The same companies are expected to introduce chip sets to support multifunction personal digital assistants (PDA) that support voice and data in the same device. Analysts say such devices for cellular networks may be available by year's end.

Today, only a couple of cross-platform offerings are available, including AT&T's EasyLink and RadioMail from RadioMail Corp. in San Mateo, Calif. For $89 a month (plus $99 setup fee and $49 for software), organizations can get an unlimited-message service from RadioMail that routes messages over either ARDIS' or RAM Mobile Data's networks. AT&T's service has similar functions and is similarly priced.



Source: Buyers Satisfaction Scorecard

Geoff Goodfellow, president of RadioMail, says his company will eventually support the whole range of "wireless clouds" (RAM Mobile Data, ARDIS, CDPD, personal communications services, or PCS, and satellites) once they are commercially available.

In addition, some significant standards activity in the wireless modem arena can ease the cost burden on the wireless end user (see story page 80).

Coverage

The lack of national coverage from any single vendor is also putting a damper on the widespread adoption of wireless.

RAM Mobile Data and ARDIS offer coverage in more than 90% of the urban business and metropolitan areas in the U.S. However, for some end-user organizations considered prime candidates for wireless systems (such as insurance companies), the lack of coverage outside metropolitan areas and travel corridors is a major problem.

By comparison, McCaw Cellular and its partners' cellular voice system (which is not yet rigged for CDPD) reaches far beyond urban areas to 96% of the geographic U.S.

"Claims adjusters and auditors need real mobile computing applications, but they often work at sites that are not in major metropolitan areas," Hengel says. Claims adjusters and field auditors inspecting damaged property for claims or evaluating new properties for coverage should be able to walk around a building or property wherever it is and remain connected, Hengel says.

Cellular clearly has the edge over packet-switched radio networks in terms of coverage, but there is a hitch. Although cellular voice service is available pervasively, CDPD is still in testing or pilot phase in only a handful of U.S. cities. Even the most rosy forecasts push CDPD out until at least the end of this year.

Andrew Seybold, editor of industry newsletter "The Outlook on Mobile Computing," blames McCaw Cellular's unrealistic promises of CDPD's availability for holding back the overall wireless market.

"By convincing computer vendors to wait for CDPD, McCaw has held the wireless market back by over a year," Seybold says. "CDPD, as envisioned by McCaw Cellular, is still at least a full year, if not two, away."

McCaw Cellular originally planned to have rolled out CDPD in 105 cities by midyear. Recently, though, the company announced a six-month slip in those plans.

And even when CDPD becomes available nationally, its cost may hold back the market. Today, cellular voice users outside their contract areas incur roaming charges of up to $2 per minute. Customers expect the same kind of charges for data and are not happy.

Chuck Parrish, general manager of mobile data at GTE Corp. in Atlanta, envisions a world in which cellular service providers such as GTE, Ameritech Corp., Bell Atlantic Corp. and Nynex Corp. band together to offer coast-to-coast CDPD coverage with no roaming charges. But at this point, it is still a marketing vision and not a promise.

Confusion

Analysts and vendors alike agree on one thing — perhaps the greatest barrier to the mainstream adoption of wireless technologies is market confusion.

"Right now, this is a very confused and contentious market," says Bennett Kobb, co-founder of

Wireless, *page 80*

KILLER APPS STILL ELUSIVE

So far, applications envisioned for wide-area wireless and those in beta testing are pretty much vertical applications.

"The way I see the wireless business in the next 18 months and beyond is one where capacity is chasing applications," says Bennett Kobb, co-founder of the Wireless Information Networks Forum and president of consultancy New Signals Research.

Some of the most promising mainstream applications are broadcast information services, transaction services and data distribution and collection, according to Mark Winther, vice president of worldwide telecommunications at Link Resources.

Topping the list, however, is two-way wireless messaging. In survey after survey, users say messaging and access to E-mail are the main wireless applications they would like to see, according to Iain Gillott, research manager at Link Resources.

Intel Corp. has been trying to make things easy for message-interested wireless users who don't mind the coverage limitations of RAM Mobile Data's packet-switched radio network. Intel packages the Intel Wireless Modem — which is an Ericsson GE Mobile Communications Mobidem AT wireless modem — with Lotus Development Corp.'s CC:Mail Wireless Pack, Microsoft Corp.'s Mail or AT&T's Mail for use over RAM Mobile Data's network. The only problem is that few users know about it, analysts say.

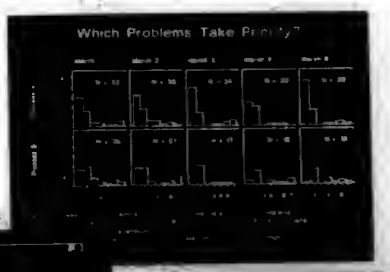
At last month's announcement of Oracle Corp.'s Media Server relational database management system, Oracle and RAM Mobile Data officials said they would announce wireless database products later in the year. Presumably, such systems would support the development of applications specifically designed for remote-user access.

Other announcements fit the same mold — existing applications with a wireless twist. Lotus has promised wireless versions of Notes for CDPD but with no release date.

At Comdex/Fall '93, demonstrations of applications running on McCaw Cellular's CDPD AirData systems included the Insurance Value-Added Network Services insurance demonstration, a wireless version of American Airline's Sabre customer reservation system and UPS' package tracking — all vertical-market applications.

The key to application availability in the wide-area wireless world, however, is the viability of the infrastructure, according to Andersen Consulting's Richard Siber. Many vendor and end-user companies will wait for such things as standard interfaces to modems and network protocols before they develop applications for wide-area wireless systems. *—Joe Panepinto*

—Anne Lynch



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WIRELESS

CONTINUED FROM PAGE 78

Wireless Information Networks Forum and president of consultancy New Signals Research in Arlington, Va.

If you thought the breakup of Ma Bell left organizations with a confusing array of choices for voice services, take a look at the lineup of wireless data service vendors and technologies.

By year's end, radio frequency, cellular-switched and packet vendors could conceivably be joined by the following:

- Satellite options when American Mobile Satellite launches a geostationary Earth-orbiting satellite in July. Since each satellite has such a huge footprint, satellite systems could all but eliminate the coverage issue.
- PCSs for voice and data. Current plans are for the Federal Communications Commission to auction spectrum for PCS use on May 7. The new spectrum allocation would allow room for up to seven new voice and data companies in each cellular services market, which currently supports only two.
- Expanded "microcellular" offerings from companies such as Microcom, inc. in Los Gatos, Calif., which built a wireless network for Apple Computer, Inc. and the city of Cupertino, Calif. Microcellular systems use low-powered cellular technology to connect companies or organizations in a metropolitan area.
- Paging vendors such as SkyTel Corp., and Embarc Communication Services, which expect additional spectrum allocation for two-way communications by year's end.

Tadeusz Cozek

"With so many competing technologies and vendors, there is some paralysis across horizontal markets," says Greg Pellegrino, director of mobile computing at the American Management Systems Center for Advanced Technologies in Fairfax, Va.

Analysts say that paralysis may end when CDPD rolls out for the simple reason that people are fairly comfortable with cellular voice and are likely to trust it with cellular data.

At the same time, better developed independent software vendors, value-added resellers and other distribution and systems integration channels may also play a role in making people more comfortable with wireless solutions. Today, very few companies (Wireless Telecomm, Inc. in Englewood, Colo., is one exception) focus exclusively on helping customers weigh their options in the wireless world and pull together an integrated system.

Most experts agree that wireless will not become a mainstream technology until mobile professionals can get to the data they need when they need it, no matter where they are.

Wireless smarts

The future of wireless, according to Richard Siber, director of wireless for the Americas at Andersen Consulting, is in such things as an intelligent networking service that, in conjunction with a multifunction handheld device, will choose the lowest-cost routing alternative over different wireless systems. Modems will be multifunctional, as will portable devices, which will resemble a combination of PDAs and telephones.

Hardware makers are coming from two directions and converging on a single personal intelligent communications device: IBM and BellSouth Corp.'s Simon is a handheld telephone enhanced with some data capabilities; Motorola's Envoy is a handheld computer that will include some voice functions, according to Roberta Wiggins, director of wireless mobile communications at The Yankee Group in Cambridge, Mass.

A typical application for this system will be global positioning services that feed information to your wireless device or allow you direct access to databases, based on your location, Siber says.

But before any of this can even begin to appeal to the mainstream market, costs need to fall significantly, Seybold says.

Wireless wide-area network monthly service costs must drop from roughly $80 per month to less than $20 per month; the cost of wireless modems must drop from more than $750 to less than $300 (comparable to standard wire-line modems).

Coverage issues also need to be settled. And, perhaps most importantly, the market has to be a whole lot easier to understand. ■

Panepinto is a free-lance writer in Amherst, Mass.

MODEM STANDARDS ARE A LINCHPIN

You can call it the calm before the storm. Before competition gets hot and heavy in wireless modems, vendors are first attempting to converge on standards that will lay the groundwork for the war to come.

"We realized we have to engage in some market-building activities right now instead of continuing to fight over market share," says William Frezza, chairman of the Portable Computer Communications Association (PCCA) modem standards committee and director of marketing and business development at Ericsson GE Mobile Communications.

"Later on we can bash each other over the head over market share," Frezza says. "Right now we have to make it cheaper and easier to use wireless across markets."

PCCA membership includes Advanced Micro Devices, Inc., ARDIS, Lotus Development Corp., Microsoft Corp., Motorola, Inc., Intel Corp., Rockwell International Corp. and RAM Mobile Data.

Earlier this month, the group closed its second ballot on adopting an extended version of the standard Hayes AT command set for use in wireless modems. A standard interface between computers and wireless modems will hasten a drop in modem prices and eliminate the need for multiple modems.

Support for the wireless AT command set allows software developers to write software that will run over multiple networks — switched cellular, CDPD and packet radio. This reduces the cost of entry for vendors hoping to make their software work over wireless and diminishes the internal IS cost for companies tweaking their own applications to run over wireless.

It also may help jump-start application development for wireless because vendors, VARs, independent software vendors and end-user organizations developing software won't be betting on the success of a single wireless network technology. Work is already under way at PCCA on a frame-based standard for wireless modems.

As for data and connection reliability over wireless networks, modem vendor Microcom, Inc.'s MNP 10 has proved to be a very promising technology, as has AT&T's ETC (Enhanced Throughput Connections). MNP 10 has been licensed to more than 40 modem vendors, and Rockwell has made it standard in its V.32 bis and higher chip sets.

— Joe Panepinto

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WIRELESS: MORE FOR YOUR MONEY

By Andrew Seybold

Our company has used wireless since the mid-1980s, and we've found something interesting: Total monthly costs have remained the same — or even decreased — as we have added more capability to our stable of wireless tools.

Our first cellular phone cost just over $1,000, and our monthly cellular bill was about $400 per month. About four years ago, we added a nationwide pager to our wireless inventory. Our unit worked on the SkyTel nationwide network, and we could receive numeric pages almost anywhere in the U.S.

The first SkyPager we bought cost just under $100, and monthly service ran about $40 per month. The first month, our combined bill for the pager and phone was just under $400, so the pager service did not cost us anything.

Why? Because we stopped giving out our cellular number. When people page you instead of calling your cellular number, charges for incoming calls are eliminated. Plus, *you* decide who to call back and when. If the call isn't urgent, it can wait until you are near a telephone.

During the next year, our monthly cellular bill continued to decrease until it averaged about $300 — a savings of $100 per month.

About a year and a half ago, we added a wireless data system. Our unit is an Ericsson GE Mobidem (wireless modem), coupled with a Hewlett-Packard HP 100LX handheld computer. The cost of this combination was about $1,200 — less today — and unlimited monthly service was $89, so the total monthly charge was still under $400.

With the new HP unit, we began using wireless E-mail in place of much of our voice traffic, which is more efficient: We find we receive more complete responses with E-mail than with voice.

Recently, we replaced our numeric SkyPager with an alphanumeric unit. Even with expanded pager capabilities (our clients and office can now send a one-way message to our pager), our total monthly cost of being wireless is less than $300 per month for the combined use of all three devices.

Customers, my office and others can send alphanumeric messages or simply their phone numbers to my pager by calling an 800-number and entering Touch-Tones. They can call another number and dictate a message or send their message directly from their computer if they have the software. They can send wireless E-mail if they have access to the Internet.

The SkyPager system sends headline news twice a day, and I can access RadioMail's NewsFactory via my wireless E-mail system anytime to find out about current events. I have developed an E-mail network of other users in the industry, and we send and receive messages about what is happening, what we think is important and its implications.

All of this — for less than $300 per month. ■

Seybold is editor of industry newsletter "The Outlook on Mobile Computing."

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Proxim's RangeLAN:
Worth the cost for niche applications

RangeLAN

Computerworld's Firing Line is an evaluation based on interviews with major users at corporate and educational installations. The product under evaluation is being used in live application environments.

- Proxim's RangeLAN is a wireless LAN that provides high reliability and data integrity, according to evaluators.
- Performance, pricing and technical support are adequate for their needs, they added.

Wireless LANs are not exactly ubiquitous in today's computing, but they are making inroads for specialized and niche applications. In addition, new wireless standards announced last week should boost acceptance.

Our evaluation of the RangeLAN product family from Proxim, Inc. in Mountain View, Calif., revealed that improved technology is making wireless more acceptable for some applications.

The evaluators who participated in this survey included technical managers and consultants from a grocery chain, a medical services company, a nonprofit advisory group and a trucking firm. All were engaged in active use and implementation of RangeLAN systems, and all were beta-testing the high-speed RangeLAN2 product line, slated to ship in April.

The format for this evaluation was designed with assistance from Howard Rubin Associates and Technology Investment Strategies Corp.

Installation

RangeLAN adapters — available for the XT/AT bus, parallel ports and PCMCIA cards — are easy to install, according to the evaluators.

All reported that initial installations took less than an hour, including reading the manuals. Subsequent installations could be done in a few minutes. Software installation on both clients and servers was equally simple, consisting only of adding device drivers to the systems.

Medical services company: "It's no problem. It takes less than 15 minutes, and the first time, less than an hour."

Reliability

It is difficult to imagine the airwaves as a reliable conduit for LAN data, but RangeLAN worked well and without failure, evaluators said. Within the scope of its operating range — 500 feet — they reported no dropped connections or interrupted communication. The grocery chain added optional antennae to boost reliability.

Grocery chain: "Once I put the bigger antennae on, that resolved" reliability problems.

Performance

The evaluators had mixed reviews on performance. They said the older RangeLAN was adequate for low-volume data links, such as simple data-entry screens. The newer RangeLAN2 products provided much higher performance.

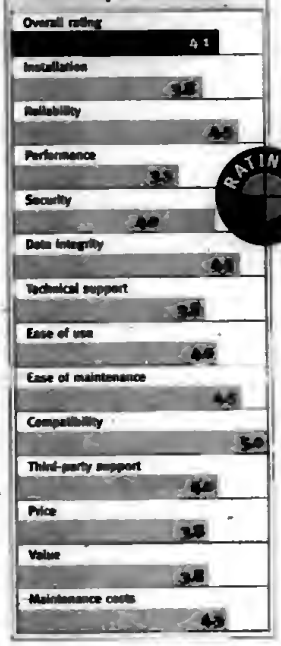
Advisory group: "It's very much like a virtual hard disk. We can transfer a 500K-byte file in a couple seconds."

Security

All RangeLAN products perform data scrambling in hardware, so no unsecure data crosses the airwaves. The evaluators reported no problems.

PROXIM'S RANGELAN

Ratings are based on user expectations on a 1-to-5 scale, where 1 is below expectations and 5 is above expectations. Ratings are presented in order of importance to users.



Medical services company: RangeLAN "has several different channels, so you just find the channel you want to use."

Data integrity

All RangeLAN devices use a media access protocol and logical link controls to maintain data integrity.

Grocery chain: "Either we got it good, or we didn't get it at all."

Advisory group: "In benign environments where the issue is distance, we're happy."

Technical support

The evaluators said technical support from Proxim ranged from adequate to good.

Ease of use

RangeLAN is a transparent communications media, the evaluators said. They could run packaged Windows software across their systems, and writing custom applications presented no special programming issues.

Maintenance

RangeLAN required no maintenance, the evaluators said.

Medical services company: "You don't have to maintain anything on it."

Compatibility

There were no reported difficulties running either packaged or custom software, according to the evaluators. In addition, they were able to run communications software such as Procomm Plus with surprisingly little difficulty.

Grocery chain: "We ran Windows through it and PC Support for AS/400. We ran a lot [of software] while testing it."

Third-party support

The evaluators said there was little need for third-party support services or products.

Price

RangeLAN adapters cost from $495 to $695. A bridge adapter to connect RangeLAN systems to Ethernet domains is roughly $2,000, depending on options. The evaluators reported spending $3,000 to $50,000 on RangeLAN systems. They considered pricing to be reasonable and somewhat lower than alternative products.

Grocery chain: Competitors "are more expensive and don't perform much better."

Value

RangeLAN is a good value, the evaluators said. Although substantially more costly than wired networking, RangeLAN was much more suitable in very specific applications where standard LANs simply wouldn't work, they said.

Written by Computerworld *senior editor Garry Ray.*

Proxim responds

Mack Sullivan, Proxim's director of marketing, responded to issues raised in this evaluation:

▶ Limitations: A fundamental trade-off [with wireless] is that of range vs. speed. Distances of 300 to 600 feet are a reasonable limit. Also, people will be hesitant [to use wireless LANs] until a standard exists. That will probably be another year.

▶ Cost: The volume [for wireless LANs] is now very low, but as economies of scale occur, that will drive down costs.

Over the next one or two years, there will not be much price degradation. But over the next three or four years, we will see significant volumes shipping for mobile computing. Prices will drop.

FAULTY SOFTWARE Problem

SOUND OFF!

AT ISSUE: Depending on who you believe, faulty software is either a serious problem or just another way for lawyers to line their pockets. Two attorneys take up the argument.

Ronald Palenski: *'The strict liability standards some plaintiffs' lawyers are looking for will only increase costs for software and systems consumers'*

Competition, not litigation, ensures quality systems

The problem of faulty systems is not as widespread as certain lawyers would have you believe. In fact, the zeal with which many law firms are going after such cases may in the end harm users and vendors more than faulty systems. Competition, not litigation, ensures quality systems.

I believe software and systems reliability has probably increased in the past 15 years. The legal system is evolving appropriately to deal with computer software and systems problems. Best of all, the fiercely competitive nature of the technology marketplace is imposing more discipline on the vendor community than a phalanx of lawyers ever will.

My evidence for systems reliability is largely circumstantial. Fifteen years ago, the hottest topic in computer law circles was how, with litigation, to get around implied warranty disclaimers and other limitations of liability found in the standard vendor contract. Successful litigators who had pleaded cases based on fraud or misrepresentation were regarded as folk heroes, eagerly sought after to recount their victories at seminars and conferences.

Today, the action has shifted to intellectual property disputes, with relatively modest attention paid to contract litigation.

This decreased emphasis on computer contract questions in computer law circles suggests that the problem of seriously flawed systems — not uncommon in the late 1970s and early 1980s — has abated. It suggests, too, that there is a well-established base of legal options for users who want redress for flawed software or systems.

The most basic of options is the Uniform Commercial Code, the law applicable to "transactions in goods" in all states (except Louisiana). This law, which governs the formation of contracts, warranties and remedies, has been applied to computer software, integrated hardware/software transactions and even to computer service transactions. While the courts haven't gone so far as to recognize "computer malpractice," they have found vendors liable for fraud and misrepresentation.

In this way, laws applicable to commercial and consumer transactions are generally being applied equally to software and systems transactions, providing buyers with recourse when necessary.

If today's software and systems are more reliable — and I believe they are — it's because vendors and customers are becoming increasingly sophisticated in identifying requirements and contracting accordingly. The intense competition in the software and systems marketplace ensures reliability as well.

In 1994, software and systems customers, whether corporate or individual, have more experience in using computer systems; hence, they better understand their needs and can incorporate their software and systems requirements in contracts where they will be regarded as express warranties. The quality movement, too, has helped. It has heightened awareness of the need to study and simplify the work processes that are being automated — a phenomenon recognized by corporate customers and savvy systems integrators.

More than anything else, however, competition in the software and services marketplace

Palenski, *page 88*

or puffery?

Responsible lawsuits keep vendors honest

I am not a gladiator on a mission to harm hardware or software vendors. What I am is a trial lawyer who believes that responsible lawsuits protect users from poorly designed software and systems.

Product liability law has been around for some time. Before such law evolved, steam vaporizers tipped over and scalded children; industrial and consumer products lacked "dead man" switches; and automobiles were not crashworthy. Product liability cases helped bring about better-designed, safer products. Plaintiffs' attorneys help advocate accountability.

Computer performance litigation is certainly not new. The widespread use of computers has dramatically increased the scope and nature of the damage that faulty systems can cause.

I recently settled a case in Massachusetts in which we alleged that a financial institution became insolvent because of a faulty turnkey computer system. The company claimed that defects in the applications software caused errors in the integrated general ledger system, passbooks and loan statements, which resulted in dissatisfied depositors withdrawing more than $5 million.

I am currently consulting for a Texas financial institution that has endured similar problems with another vendor.

Just pick up *The Wall Street Journal* and you'll find, in a recent edition, a story about a Boeing 747 that lost altitude and made an emergency landing because of an alleged defect in the plane's autopilot system. The *Journal* also reported on a carpet company that allegedly suffered a $37 million loss because of a purported failed computer system.

Users need to protect themselves as never before, and that means scrutinizing contracts. Vendors generally have succeeded in limiting their liability through restrictive warranty disclaimers in vendor/user contracts. Although many institutional users are sophisticated enough to negotiate a better bargain, vendors often insist on standard vendor-oriented boilerplate agreements.

To get around restrictive contract provisions and protect users, aggressive trial lawyers have had to allege fraud, negligent misrepresentation or violations of a particular state's consumer protection statute. However, in taking this route, plaintiffs' attorneys face a challenge to satisfy the requisite burden of proof.

Accountability is the key. Professionals such as doctors, lawyers and architects are legally responsible if their conduct deviates from established standards of care and causes damage. Product manufacturers are just as legally responsible. These manufacturers can be held liable, without proving negligence, if their products are defective and unreasonably dangerous.

Bruce Bierhans: *'Users should absolutely hold the vendor responsible for damages caused by a defective system'*

Computer software and systems manufacturers must be held equally accountable, particularly when you consider the catastrophic personal or financial injury a faulty system can cause. What if a structural engineer uses a software program that miscalculates stress loads in a building? What if a retailer's computer processes customer orders incorrectly?

Software vendors have argued that particular software programs, such as a disaster recovery software program in a nuclear power plant, are so complex that you couldn't hold the system designers liable. To the nuclear power plant's neighbors, that argument is specious and unsatisfying.

Product manufacturers know all about risk-utility analysis: If the risks inherent in the design of a product outweigh the benefits of that particular design, then you design the product differently. Make the product safe (or safer), or don't make it. If a vendor can't give a user reasonable assurances that a software product will be bug-free, users should absolutely hold the vendor responsible for damages caused by a defective system.

Accountability will spawn better-designed software products. The mere possibility that they may be held liable for damage caused by defective products that could have been more carefully written or designed will force vendors to be more careful.

Furthermore, this silent threat may promote the development of acceptable nationwide

Bierhans, *page 88*

Paleński

CONTINUED FROM PAGE 86

has intensified, giving buyers greater leverage in dealing with the vendor community. Customers are demanding open and interoperable systems with highly reliable components. The vendor that does not heed the marketplace does so at its peril.

Today, the market is ruthless in eliminating the inatteotive, unresponsive vendor — as it should be. Despite society's litigiousness, ours is primarily a market economy, rooted in the belief that vigorous competition among many providers will yield a variety of superior products and services at the lowest possible prices. Only wheo marketplace discipline fails should we resort to lawsuits.

SOUND OFF!

Litigation raises the cost of doing business, diverting scarce human and financial resources from veodors and users alike. As Abraham Lincoin, a superh trial lawyer, ooce counseled:

"Discourage litigation. Persuade ynur neighbors tn compromise whenever you can. Point out to them how the nominal winner is often a real loser — in fees, expenses and waste nf time. As a peacemaker, the lawyer has a superior opportunity of being a good man. There will still be husiness enough."

The strict liability standards some plaintiffs' lawyers are looking fnr will nnly increase costs fnr software and systems consumers. After all, someone will have to bear the financial burden of increased testing, liability insurance and the like. Yes, we can have foolproof software and fail-safe systems, hut how much are we willing to pay for them?

We have sufficient laws and mnre than enough litigation. Let's get on with the husinsss nf getting on with business. ■

Palenski is a senior vice president and general counsel at the Information Technology Association of America (ITAA), an association of computer industry vendors. The views expressed in this article are the author's and not necessarily those of the ITAA or its members

Bierhans

CONTINUED FROM PAGE 87

standards for software programmers.

For their part, individual users and companies can protect themselves during the contract negotiation stage. Users must become more sophisticated about assessing their data processing needs. They have to force vendors tn stand behind their products and accept responsibility fnr reasonably foreseeable damages system defects might canse.

Users can make sure that their attorneys include provisions in their contracts that cover product requirements, user expectations, vendnr responsibilities and remedies that take into account the needs of both parties.

Compnter performance liability insurance may prove helpful as well. Such insurance is currently availahle hut very expensive. Even so, I was recently contacted by a national actuarial firm that is condnecting a study on behalf of the insurance industry about the feasibility nf writing liability insurance. Apparently, vendnrs have expressed a keen interest in such insurance.

I believe that heightened vendor accountability and sophisticated users translate into better software products and less, rather than more, litigation. ■

Bierhans is a trial lawyer in Boston and the head of the Computer Vendor Liability Group at the Association of Trial Lawyers of America.

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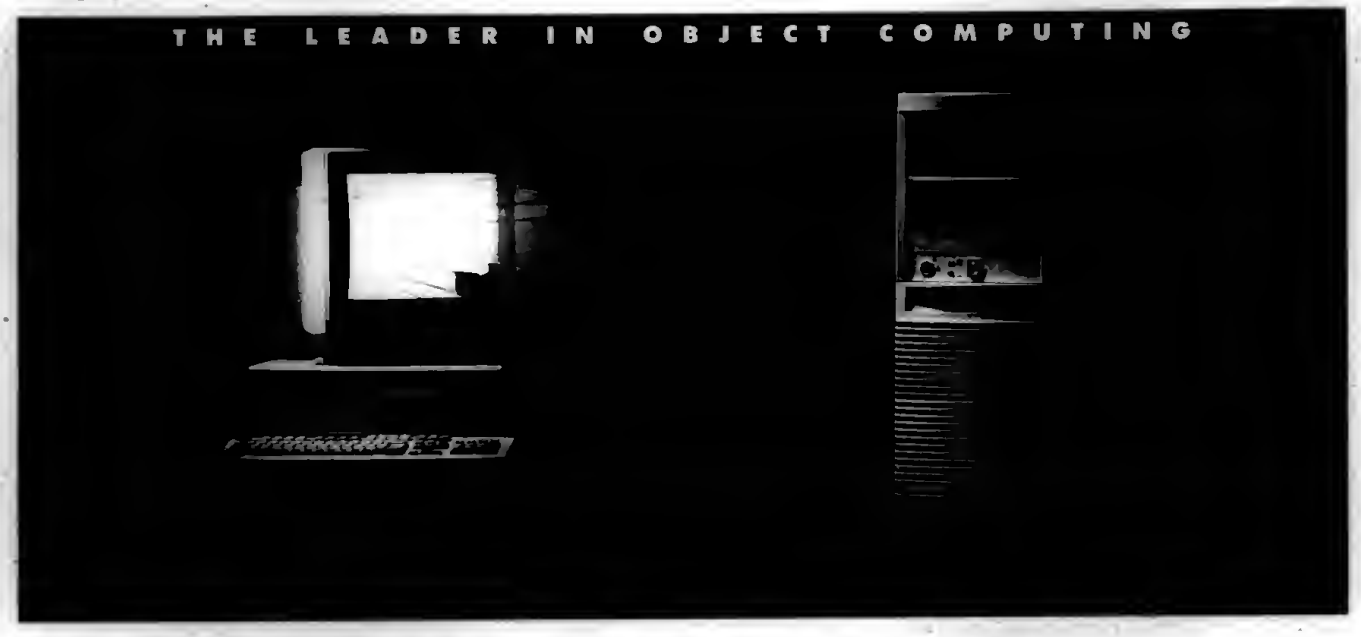

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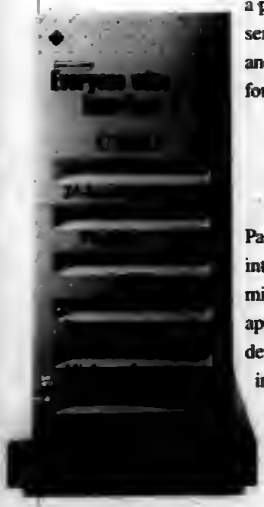

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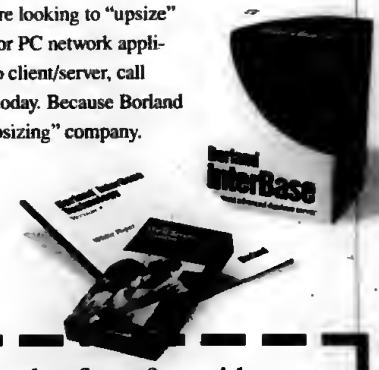

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CLIENT/SERVER TROUBLE ZONES

by david baum

Many of the new development tools on the market appear to make building client/server applications deceptively simple, but experienced developers know better. Beneath the shiny veneer lurks a number of trouble spots that can trip the unwary.

Haphazard systems administration, confusion about application partitioning and too little attention to analysis, design and database modeling issues are areas of concern. Yet some developers have found ways around these problems.

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With mainframes, there is no question about who is responsible for systems administration, data security, backup and recovery and other data center functions.

But client/server environments often have no central point of control. "Client/server involves a whole new world of maintenance," says Kipp Glover, a software engineer at Solectron, Inc. in Milpitas, Calif. "Even simple tasks such as software upgrades can become a nightmare if you don't have sufficient resources."

For example, when a new application version is completed at Solectron, it is installed individually on each client PC — a time-consuming and often confusing process.

Solectron's developers solved the problem by installing one shared drive on each of their Windows for Workgroup networks. Each client PC on the network is configured to rely on the shared drives for software updates.

"All we have to do is update one copy on each shared drive," Glover explains. "As users boot their workstations, their applications are automatically upgraded."

APPLICATION PARTITIONING

Knowing how to partition application logic among client and server nodes can also be confusing for developers. Typically, database-intensive logic is placed on the server, while activities that require lots of user interaction — sorting, querying and report writing — are placed on the client.

The problem is, once your partitioning scheme is hard-coded in this fashion, it can be very difficult to change short of a complete application rewrite.

"As the application evolves, it often must be modified to support more users, different types of processors or new functionality," says Pompi Malik, manager of information services at Brewers Retail, Inc. in Toronto. "These changes cause you to rethink the division of logic among the nodes on which that application runs."

Simple client/server applications place all application logic on the client, Malik says. Database processing is controlled by triggers or stored procedures on the server, which respond to SQL calls from the client. This is an efficient way to divide the processing load, but it generally restricts the developer to smaller applications with only 20 to 30 users.

More sophisticated client/server applications place application code on the server and the client. This makes it easier to balance the processing load as an application is scaled and lets the developer set up complex functions for multiple users. For example, the function to calculate payment of an insurance claim might reside on the server where many different insurance agents have access.

"There doesn't necessarily have to be a database involved," explains Michael Pierce, an application developer at Take Care Information Services in Aurora, Colo. "I might pass the server process bits of information that I have gathered on my window. The server takes all that and does some calculations with it and returns the results to me."

MODELING

Many of today's rapid application building tools encourage developers to dive headlong into application construction with little thought to analysis, design or database modeling. But to minimize application maintenance over the long term, Pierce says it is better if applications can draw from a common repository where reusable information assets are defined.

Companies such as Take Care can spend months establishing an enterprise data model, but it pays off down the road.

"You can cross-reference your actual client/server objects from your design documentation and vice versa," Pierce says. "First you define all your data structures. Then you define all the objects that will make up each client application. It is all stored in the repository. You can point to the existing data definitions and reuse them in other applications."

This simplifies application maintenance, Pierce says, because one change to the repository can have a ripple effect throughout many applications. ■

Baum is a free-lance writer in Santa Barbara, Calif., who specializes in emerging technologies.

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Don't get caught with your pants down

Re-engineering experience may be the latest buzzword to toss around, but be careful if you use it. Hiring managers will expect you to back it up.

By Lance B. Eliot

Buzzwords come and buzzwords go, but add "re-engineering" to your resume and be prepared to explain it in detail. In fact, many information systems managers say they want candidates with process redesign know-how, but they expect proof of what it's worth.

Tony Romanus, IS support center manager at United Parcel Service, Inc. in Mahwah, N.J., looks favorably on solid re-engineering skills, especially when launching or supporting new projects. For example, when hiring support specialists he looks for the ability to adapt to dramatic change. "I want someone with a fresh perspective and the business acumen to go beyond the typical set of technical skills."

When Romanus sees re-engineering experience on a resume, however, he carefully evaluates the claim. "I dig into the specific experience," he says. "I want to know exactly what role they played. I want to know that they were more than a casual observer when the overhaul took place."

You can't fudge it

While you can usually get away with listing a software package that you have used only once, suggesting true re-engineering experience is a different matter. "Whether a job candidate calls it re-engineering or something else, I want to hear them describe how the effort impacted the business," says Michael Anzis, vice president of IS at Mazda Motor of America in Irvine, Calif. "Can they provide training on re-engineering projects? Can they articulate how to sell the project to get it accepted?" Anzis asks. "They have to prove they were actually involved in the project."

Companies often seek this experience for reasons beyond the technical issues. "I want individuals who will serve as role models for the rest of the staff," says Larry Panatera, director of technology implementation at Pepsi-Cola Co. in Somers, N.Y. "It's useful to have IS managers and staff that can demonstrate their re-engineering prowess to peers and internal customers."

Candidates hired by Panatera have been able to clearly identify how business processes were modified and improved. They could also describe the project's impact in terms of better business practices, reduced costs and other tangibles. "By showing the way, the experienced individual can spark others to adapt to new business processes," Panatera says.

Panatera uses experienced re-engineering staff to jump-start new projects. However, given the difficulties in finding re-engineering skills, he covets the ones he can get. But Panatera cautions that such experience does not always transfer to other projects. "Anyone who thinks you do re-engineering only one way can be a detriment as well as an asset," he warns.

Reapplying skills

Rather than focusing on steps in previous projects, staffers should be able to generalize beyond prior re-engineering experiences and reapply those principles to a new job.

Stuart Gaiber, IS director at Avery Dennison in Diamond Bar, Calif., has found the success of re-engineering at his company to be ample proof of the value of hiring people with this experience. "In the 1970s we looked for strong technical skills. In the 1980s we looked for business functional skills. Now we look for re-sculpting skills."

While participation in a re-engineering project can help land your next job, do not paint a false picture. Make sure you were intimately involved in the project and can sensibly apply your experiences to other firms heading down the same path. ■

If you've been involved with a re-engineering project, IS managers will want the following information:

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- A description of the project and its impact on the company.
- An explanation of your role in the effort.
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- Examples of your ability to deal with change.

Eliot is president of Eliot & Associates, an information technology consulting firm in Huntington Beach, Calif.

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SMALLTALK	40-60K
HOGAN PA's	45-65K
IMS/DB2/DMS	40-50K
EDP Auditors	40-45K
UNIX/C++/OOP	40-60K
IDEAL/DATACOM	40-50K
ORACLE V6.0 & 7.0	40-50K
AS/400 SA's PA's	35-45K
MVS/CICS/COBOL	35-45K

For additional information on these and nationwide opportunities.

Call Don Mullis
(704) 366-1800
CORPORATE STAFFING
P O Box 221739
Charlotte, NC 28222-1739
(704) 366-0070 (Fax)

COMPUTER CONSULTANTS

Our Client, a major oil company in Saudi Arabia requires the services of 31 Consultants to fill the positions described below. As the most important supplier of computer consultants to that organization, we offer one-year renewable contracts with high TAX-FREE salaries & benefits: int'l. transport, free housing, medical insurance, local transport allowance, paid vacation leave.

8 Positions

ADW Senior Consultants

To support Information Engineering and ADW Toolset, assist project teams in using ADW (Knowledgeware) & FORESIGHT, develop, implement, support applications planning & control functions, create strategic information systems plans. Candidate should have acted in a senior project manager role with 10 years DP experience with thorough knowledge of IE concepts, ADW (Knowledgeware) Toolset, FORESIGHT methodology and JAD facilitation.

24 Positions

SYSTEMS ANALYSTS

To develop, enhance, maintain software for mainframe computer applications systems, to conduct feasibility studies & general system design. Candidate must have 6 years DP experience with thorough knowledge of DB2, COBOL2, IMS DB/DC, Tpion.

1 Position

IMAGING Senior Consultant

with solid experience in Imaging & Workflow applications, using packages such as Filenet, Archis, Plexus, Image Plus, Mars, etc. and Scanners, Juke boxes, CD-Rom.

1 Position

EDI Senior Consultant

with experience in developing & implementing large EDI applications using GENTRAN, UN/EDIFACT (Ansi X12), X-25 & X-435.

Please Send ASAP or preferably FAX your resume with a skills inventory matrix detailing your experience in number of years to:

Al-Khaled Computers - HRD
P.O. Box 2662, Al-Khobar 31952
Saudi Arabia
Fax: (966) 3-894-6032

CONSULTING

Control Solutions is offering long-term consulting opportunities locally and throughout the United States. Most positions pay between $80,000-$130,000 per year.

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- COBOL, COBOL II, DB2, CICS, VSAM
- C++, UNIX OR WINDOWS 3.1 OR VMS
- ALPHA, OSF/1, C
- SYBASE, UNIX, X-VIEW
- VISUAL BASIC, MS ACCESS
- MLS+, UNIX, C OR ADA
- C, VAX/VMS, RDB
- WANG, PACE, COBOL
- APS, IMS DB/DC
- ORACLE, FORMS 3.0, C
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CONTROL SOLUTIONS

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603-893-6776
Fax: 603-893-4208
800-998- csi 1 (2741)

AS/400 SYSTEMS ANALYST FRANKFURT, GERMANY

The Army Recreation Machine Program, is recruiting for Systems Analysts/Programmers in Frankfurt, Germany, who can design, develop, implement, and maintain data processing functions for IBM AS/400 Mid-Range computer systems. Candidates must possess:

Progressively responsible working experience with the IBM AS/400 Mid-Range computer systems which provided knowledge of its related software (RPG400, CL, SEU, SQL, and OS-400 Operating Systems.

A four-year degree and experience with Clarion, Dbase, C., Communications, and/or Novell Networks is preferred.

Salary commensurate with experience from $27,000 to $35,000 per year. Candidates recruited from the United States may receive a tax-free housing allowance and paid moving costs. A three-year transportation agreement is required. A resume, with salary history, must be sent to:

U.S. Army Community & Family
Support Center (CFSC-HRP-S)
2461 Eisenhower Avenue
Hoffman I, Room 1222
Alexandria, VA 22331-0523

The initial cut-off date for consideration is April 19, 1994.

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"SAP's dedication to superior technology has made us one of the largest, most successful and fastest growing software companies in the world."

With the advance of open systems, business process technology is the next strategic challenge. For this reason, many forward thinking companies have already put the R/3 System to work.

Like our previous R/2 mainframe software, SAP's client/server based R/3 is a fully integrated package, managing company-wide applications from Manufacturing, Finance and Order Processing to Human Resources functions.

The following positions are available at our operations located throughout the United States - Philadelphia, Boston, Dallas, Foster City (San Francisco), Atlanta, Chicago, Los Angeles and Northern New Jersey.

PRESALES

APPLICATIONS - Qualified individuals will have 3 - 5 years experience in a presales software environment in either Manufacturing, Sales/Order Processing, Finance and/or Human Resource Applications.

TECHNICAL - Applicants should have presales experience in any of the following areas: Development Tools, CASE, and Workflow Management/Office Automation Systems.

Candidates for these positions should have "hands-on" software installation experience and the ability to aid in the positioning of the sales effort for success.

CONSULTANTS

Candidates should possess a minimum of 3 - 5 years experience in the installation of various software packages related to Manufacturing, Sales/Order Processing and Distribution, Finance, and Human Resources. Prior experience in a consulting and/or software environment would be ideal.

SYSTEMS CONSULTANTS

Our R/3 system utilizes relational data base technology and runs on UNIX and other Open Systems with support for front ends running MS Windows, MOTIF and PM. We currently seek "hands-on" professionals with experience in the following: ***• Data Base Administration • UNIX System Administration • Networking***

We offer an exceptional salary and benefits package including profit sharing. Individuals interested in exploring these opportunities should FAX or mail a resume and salary requirements in confidence to: **Recruiting Manager, SAP America, Inc., International Court Three, 300 Stevens Drive, Philadelphia, PA 19113. FAX (215) 595-4819.** *Equal Opportunity Employer, M/F/D/V*

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UNISYS

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Research and Development (R & D) Position: Development of graphics standards and conformance tests in support of an open systems environment.

* Plan, initiate, and conduct applied research leading to computer graphics standards, guidelines or other material necessary for more efficient utilization of computer graphics technology in an open systems environment.
* Design and develop conformance tests for the Programmers Hierarchical Interactive Graphics System (PHIGS). These tests determine conformance to the American National Standard Institute (ANSI), International Organization for Standardization (ISO), and Federal Information Processing Standards (FIPS) for PHIGS.

Qualifications: Bachelor's or higher degree that included 30 semester hours in a combination of mathematics, statistics and computer science. At least 15 of the 30 semester hours must have been in any combination of statistics and mathematics that included differential and integral calculus. One year of specialized experience equivalent to next lower grade in or related to the duties described above is required. Applicants must have skill in the use of ISO/IEC 9592 and FIPS 153 (PHIGS); skill in the use of ISO/IEC 9593.1 and ISO/IEC 9593.4, PHIGS FORTRAN and PHIGS C Language Bindings, and skill in the development of PHIGS conformance tests based on ISO and FIPS PHIGS standards.

SALARY: ZP-1550 Level IV (equates to GS 13/14) ranging from $49,947-$76,733, depending upon qualifications and experience. Position offers excellent career benefits and professional growth opportunities. The National Institute of Standards and Technology is an Equal Employment/Affirmative Action Employer. U.S. Citizenship required. Payment of relocation fees is not authorized. Please send your application for Federal Employment (SF-171), a copy of your college transcript or a completed OPM Form 1170/71 (list of College courses); addendum sheet addressing the skills stated above, and documentation verifying veterans preference if claimed to:

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National Institute of Standards and Technology
Office of Personnel and Civil Rights
(NIST/94-0090/LC) Closing Date: 04/22/94
Administrative Building, Room A-123
Gaithersburg, MD 20899

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Project Managers
Program Managers
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System Architects
Network Specialists

Software Developers
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(206) 637-0130 **(206) 637-9550 FAX**

Applications Programmer (Houston, TX area client site) Develop, code, test, maintain, and document financial and commercial applications systems, using CSP, COBOL, and DB2 on IBM mainframes. Bachelor's degree in Comp. Sci., Math, Engineering, or Business Admin. and 2 yrs. exp. in job req. 40 hrs/wk, 8:30-5, $38,500/yr. Apply at the Texas Employment Commission, Houston, TX or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778, J.O. #TX8944461. Ad Paid by an Equal Opportunity Employer.

PROGRAMMER/ANALYST: 40 hrs./wk., 8am - 5pm, $40,000/yr. Develop computer software application systems • a client/server environment utilizing VMS, UNIX, C, TCP/IP and DECnet. Prepare program specifications and test data. Carry out unit and system testing and assist in technical documentation. Reqr. Bachelor's degree in Computer Science, Electrical Engineering, 2 yrs. expr. • job offered or 2 yrs. expr. as Technical Analyst/Programmer, Software Engineer. Expr • development of computer software application systems utilizing VMS, UNIX, C, TCP/IP and DECnet. "Employer paid ad" E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. No: 12084.

Development Engineer Manager II - Manage large dev eng. projects, incl. dev. strategies & objectives. Identify & allocate resources to assure achievement of objs. w/i est. budget & schedules. Indent. & brk. methods to improve processes, products, reduce cost, increase output; manage team of s/w engineers in driving spec., design, implementation, integration & test of new VHDL language features for VHDL simulators; matrix manage marketing & customer support engineers • planning & exec. of interdisciplin. project activities; also cont. to Top Down Design planning. $85,000/yr., 40 hrs./wk. Req. B.S. • C.S., Math, E.E. or related field, and 8 yrs. exp. in software development. Exp. must include: min. 4 yrs. exp. in software dev. project mgmt., incl. mgmt of eng. team to meet bus. objs. & mgmt. of large, highly complex s/w projects, mgmt. of dev. of VHDL products; • depth knowledge of C or C++ developed • UNIX environment; exc. written & oral comm. skills. Place of employment and interview: Wilsonville, OR. If offered employment, must show legal right to work permanently • the U.S. Clip ad and send with resume to: Attn: Job Order #5550867, 875 Union Street, N.E., Room #201, Salem OR 97311. This company is an equal opportunity employer and fully supports affirmative action practices.

Software Engineer: Work on various proj incl dvlpmnt of software on IBM 3090, MVS/XA over MCI satellite line thru 3174 controller & codex modem. Create insurance modules like UPS, LMS and PDE. Involved in proj plng, coding, dbgging & trbleshoting. Use ISO 9000/ISI 19000 stds. Dvlp & convert from VSAM to DB2. Make use of LMS & UPS & dvlp system from existing system in IMS, CICS to DB2 & CICS. Dvlp systs using CICS, DB2, VSAM & JCL. Design & develop cost estimation, inventory, sales analysis & payroll systems. Bachelor • Engg or Compt. Science plus 1 yr exp. as software engineer or 1 yr exp. as software or technical consultant or syst analyst/executive. Must have one yr exp. in job duties if qualifying based on related occupation. In lieu of Bachelors will accept 3 yrs of college & 2 yrs of work exp. $47,200/yr. 40hrs/wk, 9a-5p. Must have proof of legal authority to work in the U.S. Send your resume to Mr Bernard Childerston, Nebraska Department of Labor, P.O. Box 94600, Lincoln, Nebraska, 68509. Refer to Job Order NE 0103184. This AD is paid for by the employer.

PROGRAMMER/ANALYST: 40 hrs./wk., 8am-5pm, $39,900/yr. Analyze, design and develop mainframe-based computer s/w systems for manufacturing applications on IBM 3090 mainframe, utilizing COBOL, CICS and DB2. Assist • preparation of high-level design specifications. Assist • formulating strategies for system development, testing, implementation and post-implementation. Reqr. Bachelor's degree • Computer Science, Electrical or Mechanical Engineering, 2 yrs. expr. in job offered or 2 yrs. expr. as Systems Analyst/Programmer. Expr • design & development of computer s/w application systems on IBM 3090 mainframe utilizing COBOL, CICS and DB2. "Employer paid ad" E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. No: 11884.

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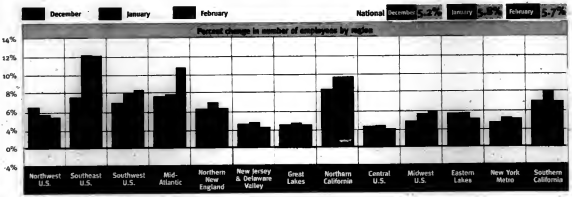

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System professionals with solid experience using: [illegible] DB/DC, DB2, JCL, MVS, TELON & COBOL II required.

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- a brilliant and intense **SENIOR PC/LAN "C" PROGRAMMER**
  We need someone who is the best and brightest in the industry. A programmer who not only walks on water, but ionizes it as he or she passes. Someone who knows 'C' better than Kernighan and Ritchie.
- a brilliant and artistic **SENIOR GUI PROGRAMMER**
  We need the Michaelangelo of Windows, the Vincent Van Gogh of Visual C++, the Mozart of menus, the Goethe of GUI, the ... well, you get the idea.
- a brilliant and sadistic **SOFTWARE TESTER**
  Are you a 'C' programmer who turned down a promising career with the KGB in order to go into software? Here is your chance to torture some code until it confesses (the location of its bugs).
- a brilliant and charming **TECHNICAL SUPPORT ENGINEER**
  You're a great 'C' programmer, but lately you've started to develop a personality. There are days when you would rather talk to people than search for undocumented APIs. What to do? Consider a move into technical support.
- a brilliant and relentless **MARKETING PRODUCT MANAGER**
  Today, there are many software companies in the Enterprise Storage Management market space. Your job will be to correct this unfortunate state of affairs. In the end, there can be only one.

We are looking for capability, not credentials. We want people who:

- are intellectually incandescent, relentless in applying their considerable talents, and comfortable working in an unstructured environment
- truly love to develop, test, support, and/or market systems software (computers are your life)
- want to work for a software vendor

For these special individuals, we offer the opportunity to work with other high-bandwidth software professionals in a smoke-free, suit-free, and politics-free environment. For immediate consideration for these historic opportunities, please mail, FAX or E-mail something about yourself, including your SAT, ACT, and/or GRE scores (no kidding, we need these) and your current salary, to our recruiter:

MISSION CRITICAL SOFTWARE, INC.
C/O EDP PERSONNEL
5005 Woodway Drive, Suite 210, Houston, TX 77056
FAX 713-629-1106 CompuServe 72066,2264
INTERNET: 72066.2264@compuserve.com

PLEASE DO *NOT* TELEPHONE OR VISIT US

LEADING EDGE OPPORTUNITIES

Entergy, one of the nation's largest electric energy companies and a leader in the utilization of evolving technologies, is currently seeking world class information technology professionals experienced in UNIX and data base administration.

UNIX System Administration

Will support open systems platforms. The candidate will be responsible for both hardware and operating systems maintenance, and day-to-day operations of a variety of primarily UNIX computer systems, used as SYBASE/ORACLE servers and application program development platforms. System Automation, performance monitoring and tuning, as well as backup/recovery and disaster recovery procedures will be part of the candidate's responsibilities. The candidate will also participate in the development of policies and procedures for a distributed environment.

Ideal candidate will possess a technical degree and have five plus years' experience in UNIX system administration. Networking, TCP/IP, MS-DOS TCP/IP clients, strong troubleshooting and problem isolation skills at the operation level a plus. Hands-on experience with at least two of the following platforms: Sun Microsystems with Solaris 2.X, IBM RS6000 with AIX, HP 9000 with HP/UX, or UNIX System V Release 4 is required. Ability to program with at least two of the following: C, PERL, SH, KSH, SQL, SED, or AWK is also required.

Data Base Administration

Will support multiple SYBASE and ORACLE production environments. The candidate will be responsible for control block generation, data base performance monitoring and tuning, logical and physical data base design, data base integrity verification, and recovery procedures for both DBMS systems. The candidate will also participate in the development of policies and procedures for a distributed data base environment.

Ideal candidate will possess a technical degree and have three plus years' experience in data base administration. Experience in one of the two RDBMSs is required. IMS or DB2 experience a plus.

Entergy's current environment consists of three IBM mainframes supporting production applications in IMS DB/DC and CICS/DB2, and numerous UNIX-based systems supporting production applications in SYBASE and ORACLE. Future applications will be developed in a distributed architecture.

The benefits of working for our multi-billion dollar organization include excellent compensation and benefits programs including paid relocation and incentive pay plans. If you are up to the challenge of remaining on the edge of technology, send or FAX your resume, including salary history, to: **Entergy Services, Inc., Human Resources, P.O. Box 61000, New Orleans, LA 70161; FAX: 504-569-4428.** An Equal Opportunity Employer, M/F/D/V

ENTERGY

System Architect, 40hrs/wk., 8am - 5pm, $53,572/year. Analyze, design, develop and test customized information systems for business clients. Conduct requirements analysis and prepare documentation using Structured Analysis methodology. Development & prototyping using CASE tools. Write applications for both batch and online modes. Software debugging. User training. Tools: COBOL, C, ASSEMBLER, CICS, INTERTEST; IBM mainframe; PC/AT. B.S. in Computer Science or Electrical Engineering as well as two years experience as a System Architect or Programmer/Analyst required. Previous 2 years experience must include: COBOL, CICS, INTERTEST or EZTEST, IBM mainframe; development & prototyping using CASE tools; user training; PC/AT. Must have proof of legal authority to work permanently in the U.S. Send two copies of resume to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 3 South, Chicago, IL 60605, Attention: Dennis Jones, Reference #V-IL-11606-O. NO CALLS. An Employer Paid Ad.

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TCI TECHNOLOGY CONSULTING INC

1800 Meidinger Tower Louisville KY 40202 FAX 502-589-3107

CLIENT/SERVER DEVELOPMENT

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• UNIX	• VISUAL BASIC	• INFORMIX
• RPG 400	• C/C++	• SYBASE
• SYNON	• POWERBUILDER	• TCP/IP
• WINDOWS	• ORACLE	• AIX

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Cincinnati, Ohio 45202
Fax 513-721-8844

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- VISUAL BASIC
- [illegible] DB2 DECForms

Fax or send your resume to:

ProTech Systems Group, Inc.
[illegible] Murray Road Suite 300
Memphis, TN 38118
800-456-[illegible]
Fax 901-767-8350

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PowerBuilder

C, C++, Visual Basic

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11 Technology Circle
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Urgent needs for any of these unique skills:

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• Sybase, many needs	• TSO/SPF
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Buy smart: BBS software

By Joe Panepinto

Experts have simple advice to start you on the road to buying your own bulletin board system (BBS): Buy a modem, call a variety of services and get an idea of what's out there.

"Call a BBS in your industry or a bunch of local ones to get a feel for the software you like best," says Jack Rickard, editor of *BoardWatch*, a monthly magazine in Littleton, Colo. Most packages handle menuing differently and therefore, "the best" is pretty much a matter of opinion. Thus, the more interfaces you see, the better-informed you will be.

BBSs support a number of platforms, with the majority running on DOS. Minimum prices range from free to $2,000 for Teamate, a Unix-based product from MMB Development Corp. in Manhattan Beach, Calif. Typically, the price varies upward as the number of lines supported grows.

The minimum price of the four top-selling BBS software packages (see chart) ranges from $129 for Wildcat from Mustang Software, Inc. to $295 for TBBS from ESoft, Inc. All run on DOS.

The following are several points on which to evaluate the packages:

Multitasking/multiuser. This refers to the architecture on which a particular BBS package is built. Wildcat and PCBoard from Clark Development, Inc. are multitasking systems that support multiple users by essentially running multiple copies of the software.

For multitasking systems, the PC DOS platform must be outfitted with DesqView from QuarterDeck Systems, Inc. so that it can run multiple versions of the software. Even then, BBS software built on multitasking architectures can support only eight simultaneous users per PC. In contrast, multiuser software, such as TBBS and The Major BBS from Galacticomm, Inc., can support more users per PC.

The advantage of multitasking BBS software is its low entry price — less than $170 for PCBoard and sometimes less than $100 for Wildcat. The advantage of multiuser BBS software is that it takes less hardware to support more users.

LAN log-ons. In addition to supporting dial-in users, a BBS package may support log-ons from users on a LAN. This is important if internal users are going to use the BBS, say for product support, and the company does not want to tie up a phone line. Currently, Wildcat, The Major BBS and PCBoard support LAN log-ons.

Interconnectivity. A company may want to provide users with messaging capabilities across other network platforms such as Fidonet (a BBS hobby network), the Internet and QWK (a format for off-line batch mail).

Each of the leading vendors supports all three forms of messaging internally or through proprietary or third-party options.

Chat capabilities. All the major vendors support a chat function, which allows users to communicate synchronously. This feature is more important for hobby or recreational BBS than it is for commercial BBS.

A complete BBS setup includes a PC, modems, an intelligent multiport card to handle multiple phone lines, BBS software and a LAN card if users plan to log on from a LAN. An entire system can be built for between $6,500 and $10,000, Rickard says. ■

Panepinto is a free-lance writer in Amherst, Mass.

Top sellers

	Commercial*	Hobbyist
PCBoard *Clark Development, Inc., Salt Lake City*	55%	45%
Wildcat *Mustang Software, Inc., Bakersfield, Calif.*	75%	25%
TBBS *ESoft, Inc., Aurora, Colo.*	75%	25%
The Major BBS *Galacticomm, Inc., Fort Lauderdale, Fla.*	80%	20%

*May include government, education, corporate and subscription services.

Source: Vendor estimates

Down the line

The most common mistake companies make is overestimating the number of lines they need to support a BBS. But there's help.

Two principals at ESoft have written books about BBS, the Internet and on-line uses of the PC. President Phil Becker's *Introduction to PC Communications* includes this formula: **Number of lines = (hours per call) × (callers per period) ÷ (hours per period).**

Hours per call is usually a fraction of an hour (15 minutes = 0.25 hour); callers per period = number of callers expected during the hours the BBS will be in operation (per day or week); hours per period = number of hours of operation (per day or week).

A company may expect 100 calls in an eight-hour day, with each call lasting 15 minutes. The equation for determining the number of lines it needs is 0.25 × 100 ÷ 8 = 3.125. This company needs three or four lines to support its expected BBS traffic.

Alan Bryant, director of marketing at ESoft, says he believes this formula is too generous. In his upcoming book, *Creating Successful Bulletin Board Systems*, he suggests taking the final number and dividing it in half.

"People tend to overestimate those numbers because they are usually guessing about callers per period and length of calls," Bryant says. Some rules of thumb: Chat calls average around 45 minutes, general-usage calls last about 15 minutes and calls for file-downloading will vary.

Jim Harrer, president of Mustang Software, suggests an easier way. Companies unsure of BBS traffic should set up a two-line system using the "hunt" service from the phone company.

If Line 1 is busy, the call gets forwarded to Line 2. Set up the two-line system and then monitor use of Line 2. If it is busy more than 50% of the time, the company should add another phone line.

—Joe Panepinto

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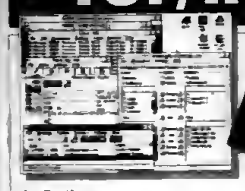

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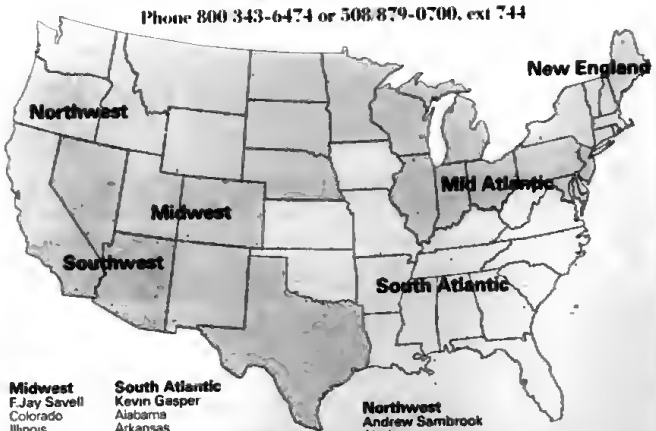

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Gainers Losers

Percent

Gainers		Losers	
McAfee Associates	30.3	Creative Technologies Inc.	-26.2
Optical Data Systems Inc.	17.8	Novell Inc.	-19.9
Ross System	14.9	Information Resources(L)	-18.0
Borland Int'l. Inc	12.5	Kendall Square Research	-17.4
CE Software	11.1	Wellfleet Communications(H)	-17.2
Cambex Corp.	10.1	Cisco Systems Inc.	-14.9
Anacomp Inc.	10.0	Software Spectrum Inc.	-14.7
Netrix Corp.	9.6	Conner Peripherals	-14.6

Dollar

Gainers		Losers	
Microsoft Corp.	4.00	Cabletron Systems	-16.13
General Motors E (EDS)(H)	2.63	Wellfleet Communications(H)	-14.75
Bell Atlantic Corp	2.50	Creative Technologies Inc.	-8.25
Optical Data Systems Inc.	2.50	Matsushita Electronics	-7.50
McAfee Associates	2.50	Cisco Systems Inc.	-5.88
Dell Computer Corp.	1.63	Lotus Development(H)	-5.50
Borland Int'l Inc.	1.63	Texas Instruments(H)	-5.13
Symantec Corp.	1.50	Novell Inc.	-4.25

The midweek interest rate hike pushed the market lower last week, pulling down technical stocks. Investors' displeasure over the intended buyout of WordPerfect Corp. further hurt Novell, Inc.'s share price but boosted Lotus Development Corp. and Microsoft Corp. stock, analysts said.

[redacted]

Walker races to client/server

Even though **Walker Interactive, Inc.** (WALK) has not yet jumped onto the client/server bandwagon, its shares closed Wednesday just off a 52-week high at 12¾.

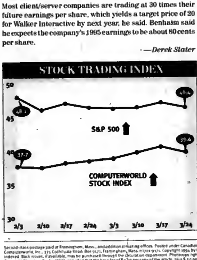
The San Francisco company is working feverishly on a client/server version of its high-end financial software. Right now, however, Walker Interactive sells only mainframe products. Six months ago that focus was regarded as something of an albatross on Wall Street; Walker Interactive's share price was less than $7 in October 1993.

"I think people are coming to realize the mainframe market is doing better than expected," said David Benhaim, a Boston-based software analyst at First Albany Corp.

He noted that Walker Interactive has continued to win new customers for its mainframe products. Benhaim also said the client/server version is performing well at its first beta site, and it will be one of the most technically advanced client/server financial solutions around when it becomes generally available.

Benhaim said he rates Walker Interactive's stock a Buy. Most client/server companies are trading at 30 times their future earnings per share, which yields a target price of 20 for Walker Interactive by next year, he said. Benhaim said he expects the company's 1995 earnings to be about 80 cents per share.

—Derek Slater



Communications and Network Services — Off 2.xx%

Exch	52-Week Range			Mar. 25 Close	Wk Net Change	Wk Pct Change
OTC	43.75	18.63	3 COM Corp. (H)	61.88	0.63	1.0
NYS	65.50	35.50	Ameritech Corp.	39.88	-1.00	-2.4
NYS	65.00	50.75	AT&T	53.00	-0.50	-0.9
OTC	26.50	12.50	Banyan Systems Inc	15.83	0.63	4.2
NYS	69.13	50.75	Bell Atlantic Corp	54.75	2.50	4.8
NYS	63.88	50.63	BellSouth Corp	55.63	0.62	1.1
NYS	21.50	4.25	Bolt, Beranek & Newman (H)	19.50	-0.13	-0.6
OTC	15.75	9.50	Brooktrout Technology	35.00	0.00	0.0
NYS	132.50	79.50	Cabletron Systems	112.50	-16.13	12.5
OTC	43.00	15.25	Centigram Communications	39.75	-1.00	-2.5
OTC	60.25	28.75	Chipcom Corp (H)	50.25	0.25	0.4
OTC	40.25	19.38	Cisco Systems Inc.	33.50	-5.88	-14.9
OTC	18.38	8.00	Compression Labs Inc.	13.00	0.38	3.0
OTC	36.00	13.25	CrossComm	15.00	0.00	0.0
OTC	4.25	1.50	Data Switch Corp	2.38	-0.13	-5.0
OTC	7.25	2.25	Digital Systems Int'l Inc.	2.75	0.00	0.0
OTC	73.13	25.38	DSC Communications	54.12	1.00	-1.8
OTC	8.25	2.88	Fibronics Int'l Inc.	2.88	0.00	0.0
OTC	3.63	0.81	Gandalf Technologies Inc.	1.22	-0.03	2.5
OTC	1.63	0.69	Gateway Communications	0.88	0.06	7.6
NYS	17.63	8.00	General DataComm Inds. (H)	14.38	-0.38	-2.2
ASE	2.13	2.00	Go Video	2.18	-0.06	2.8
NYS	39.88	31.13	GTE Corp	31.63	-0.38	1.2
NYS	95.97	71.09	ITT Corp.	81.75	2.38	2.8
OTC	29.88	21.44	MCI Communications Corp.	24.38	-0.80	3.5
OTC	7.75	1.50	Microcom Inc. (H)	6.63	-0.13	1.8
OTC	7.25	3.50	Netrix Corp	7.13	0.63	9.8
OTC	12.00	6.00	Network Computing Devices	6.75	-0.75	30.0
NYS	11.13	5.38	Network Equipment Tech	8.50	0.50	6.3
OTC	29.38	8.00	Network General	19.50	-2.63	-11.9
OTC	10.50	6.88	Network Systems Corp	7.88	0.13	1.6
OTC	75.88	27.50	Newbridge Networks Corp.	88.38	-1.63	-2.6
NYS	38.63	21.38	Northern Telecom Ltd.	30.38	0.00	0.0
OTC	34.00	17.00	Novell Inc.	18.13	-4.75	-19.9
NYS	48.88	35.38	Nynex Corp. (L)	35.88	-0.75	-2.0
OTC	30.00	18.00	Octel Communications Corp	27.25	-0.88	3.1
OTC	18.25	8.75	Optical Data Systems Inc	16.50	2.50	17.9
OTC	7.50	3.75	Penril DataComm Networks	6.88	0.00	0.0
OTC	27.25	12.50	PictureTel Corp	13.50	-0.75	-5.2
OTC	8.25	3.63	Proteon Inc.	6.50	-0.38	-5.5
NYS	38.88	22.38	Scientific Atlanta Inc	31.00	0.38	-1.2
NYS	47.00	36.75	Southwestern Bell Corp.	40.88	0.38	0.8
NYS	40.25	29.50	Sprint Corp.	34.63	-0.12	-0.4
OTC	26.75	12.50	Standard Microsystems Corp	17.75	-0.88	-4.7
OTC	39.75	10.50	Stratacom Inc.	18.13	0.38	2.1
OSC	42.75	20.00	Synoptics Communications	23.00	-2.38	13.5
OTC	15.25	2.88	Telebit Corp. (H)	13.25	1.25	-8.6
OTC	46.00	18.25	US Robotics	39.25	-1.25	3.1
NYS	50.75	38.50	U S West Inc (L)	40.75	1.38	3.5
OTC	87.25	38.50	Wellfleet Communications (H)	71.25	-14.75	-17.2
OTC	28.25	7.25	Xircom	25.50	-1.25	-4.7
OTC	30.00	15.25	Xyplex Inc.	37.75	-0.50	2.7

PCs and Workstations — Off 1.01%

Exch	52-Week Range			Mar. 25 Close	Wk Net Change	Wk Pct Change
OTC	7.25	2.50	Advanced Logic Research	7.13	0.38	5.6
OTC	59.12	22.00	Apple Computer Inc.	33.25	-3.00	-8.3
OTC	33.00	12.75	AST Research Inc	22.25	-1.50	-6.3
NYS	5.13	2.50	Commodore Int'l	3.00	0.00	0.0
NYS	104.88	63.13	Compaq Computer Corp. (H)	100.00	3.63	3.5
OTC	36.50	13.50	Dell Computer Corp	28.38	1.63	6.1
OTC	25.00	16.75	Gateway 2000 Inc.	10.88	-0.38	-1.9
NYS	93.63	64.38	Hewlett Packard Co	84.25	-4.50	-5.1
NYS	26.88	11.75	Silicon Graphics (H)	25.38	1.13	-4.3
OTC	32.63	23.13	Sun Microsystems Inc.	27.75	2.50	-8.3
NYS	50.75	27.88	Tandy Corp	40.88	2.12	-4.9
OTC	5.38	2.50	Zeos International Ltd.	3.38	0.25	8.0

Large Systems — Off 3.65%

Exch	52-Week Range			Mar. 25 Close	Wk Net Change	Wk Pct Change
ASE	7.38	4.38	Amdahl Corp	6.63	-0.13	1.8
NYS	7.63	3.63	Convex Computer	6.63	0.00	0.0
OTC	4.50	1.88	Cray Computer	2.50	-0.13	-4.8
NYS	33.75	20.38	Cray Research Inc. (H)	31.38	-1.50	-4.6
NYS	12.63	7.13	Data General Corp	7.50	-0.11	1.6
NYS	48.25	27.75	Digital Equipment Corp.	31.63	-1.25	-3.8
NYS	57.25	33.88	Harris Corp	48.88	-2.13	-4.2
NYS	60.00	40.63	IBM	54.13	-2.88	-5.0
OTC	25.75	3.38	Kendall Square Research	4.75	-1.00	17.4
NYS	176.00	106.25	Matsushita Electronics	164.00	-7.50	-4.4
OTC	18.75	12.75	NetFrame	15.75	-1.00	-0.7
OTC	26.00	9.25	Parallan Computer	12.50	0.75	6.4
OTC	23.25	11.25	Pyramid Technology	13.25	-0.75	-5.4
OTC	21.25	11.25	Sequent Computer Sys.	13.38	1.25	8.5
OTC	6.64	1.75	Sequoia Systems Inc	6.06	-0.03	-0.5
NYS	41.25	20.29	Stratus Computer Inc	26.25	-2.38	-8.9
NYS	16.38	8.50	Tandem Computers Inc. (H)	14.88	-0.38	-2.5
OTC	30.00	10.88	TriCord Systems	16.25	1.00	6.4
NYS	16.50	9.88	Unisys Corp	15.63	-0.13	-0.8

Software — Off 1.40%

Exch	52-Week Range			Mar. 25 Close	Wk Net Change	Wk Pct Change
OTC	37.00	16.25	Adobe Systems Inc	26.50	3.13	10.5
OTC	34.50	13.50	Aldus Corp. (H)	29.50	-3.00	-9.2
OTC	8.88	5.12	American Software Inc.	5.75	-0.12	-2.3
OTC	25.00	6.75	Ask Computer Systems (L)	7.75	0.25	3.3
OTC	81.75	47.00	Autodesk Inc.	59.50	0.75	1.3
OTC	4.50	2.38	Bachman Info. Systems	3.00	0.13	4.3
OTC	41.00	24.00	BGS Systems Inc.	24.00	-1.75	4.8
OTC	71.00	38.75	BMC Software Inc.	64.75	4.25	6.2
OTC	28.25	20.38	Boole & Babbage	23.88	-0.38	1.5
OTC	27.25	12.00	Borland Int'l. Inc.	14.63	1.63	12.5
OTC	4.62	2.75	CE Software	3.25	0.38	11.1
ASE	44.50	19.00	Cheyenne Software Inc. (H)	41.00	2.00	-4.7
OTC	14.75	6.00	Cognos Inc	11.62	-0.25	-2.1
NYS	44.88	21.88	Computer Associates	37.00	1.63	-4.2
NYS	5.38	2.13	Computervision Corp (H)	5.00	0.25	5.3
OTC	47.25	19.25	Compuware Corp. (H)	43.50	2.50	-5.4
OTC	12.75	5.75	Comshare Inc. (H)	11.75	-0.38	-3.1
OTC	22.00	6.83	Corel Corp	20.88	1.00	5.0
OTC	10.25	3.38	Easel Corp	5.75	-0.25	4.2
OTC	28.25	8.75	FileNet Corp. (H)	27.75	-0.50	1.8
OTC	25.00	7.25	4th Dimension (L)	8.13	0.13	1.6
OTC	13.12	5.23	Frame Technology	9.50	-0.25	-2.6
OTC	15.00	7.00	Group 1 Software	9.00	0.00	0.0
OTC	31.75	13.50	Gupta	23.88	0.88	3.3
OTC	12.00	6.13	Hogan Systems Inc	9.50	1.00	-9.5
OTC	29.50	11.25	IMRS	25.88	0.13	0.5
OTC	44.75	18.25	Information Resources (L)	18.75	-4.00	18.0
OTC	27.25	13.38	Informix Corp	21.25	2.00	-8.6
OTC	12.38	8.50	Intergraph Corp	8.83	-0.13	1.5
OTC	9.60	4.88	Interleaf Inc.	7.63	-0.88	10.2
OTC	14.88	4.75	Intersolv Inc. (H)	14.88	1.00	7.3
OTC	10.75	7.75	KnowledgeWare Inc.	14.75	-0.25	-1.7
OTC	41.00	15.50	Legent Corp	29.00	-4.00	12.1
OTC	86.50	23.50	Lotus Development (H)	78.50	-5.50	-6.5
OTC	14.50	4.25	MathSoft	6.13	0.38	6.5
OTC	10.75	4.50	McAfee Associates	10.75	2.50	30.3
OTC	17.25	7.88	Mentor Graphics (H)	15.25	-0.13	-0.8
OTC	37.50	13.12	Micro Focus	13.63	0.75	-5.2
OTC	11.63	4.38	Micrografx Inc.	8.75	0.63	7.7
OTC	98.00	70.38	Microsoft Corp	88.75	4.00	4.7
OTC	27.25	15.88	Oracle Corp	33.38	-1.38	-4.0
OTC	44.75	22.50	Parametric Technology	32.13	1.13	-3.4
OTC	41.38	26.00	PeopleSoft (H)	36.88	2.38	6.1
OTC	8.25	3.50	Phoenix Technologies (H)	5.75	-0.13	-2.1
OTC	68.50	22.00	PowerSoft (H)	64.75	1.25	2.0
OTC	39.75	9.50	Platinum Software	12.38	-0.38	-2.9
OTC	16.75	7.25	Platinum Technology	15.75	-0.75	-5.1
OTC	80.25	32.25	Progress Software Corp.	88.00	3.75	7.1
OTC	4.09	1.94	Quarterdeck Office Sys.	5.08	-0.34	10.2
OTC	32.00	17.00	Rainbow Technologies Inc.	17.75	-1.75	-9.0
OTC	33.38	4.25	RasterOps	6.63	-0.25	-3.6
OTC	35.25	4.50	Ross Systems	8.75	0.88	14.0
OTC	28.75	11.00	Sapiens Intl. Corp. N.V	12.50	-0.50	3.8
OTC	14.38	5.50	Software Publishing Corp	7.63	0.25	3.4
OTC	17.25	6.75	Software Toolworks Inc.	11.00	-0.63	5.4
OTC	12.75	6.25	State of the Art	8.75	0.25	2.9
NYS	35.63	17.63	Sterling Software Inc	32.38	-1.38	-4.1
OTC	21.63	12.00	Struct. Dynamics Research	14.63	-0.63	-4.1
OTC	53.25	25.38	Sybase Inc.	48.75	-3.13	-6.3
OTC	20.50	10.88	Symantec Corp.	17.75	2.50	0.3
OTC	52.75	29.25	SynOptics	45.50	0.12	0.3
OTC	24.25	11.50	System Software Assoc.	16.75	-0.75	4.4
OTC	6.75	2.88	[illegible] Corp	4.25	-0.25	5.6
OTC	50.00	13.50	ViewLogic Systems	29.00	0.13	0.6
OTC	12.38	5.50	Walker Interactive Systems	12.38	-0.38	-2.9

Semiconductors — Off 1.21%

Exch	52-Week Range			Mar. 25 Close	Wk Net Change	Wk Pct Change
NYS	32.88	18.75	Advanced Micro Devices	29.75	0.00	0.0
NYS	33.13	17.13	Analog Devices Inc.	28.88	-0.75	-1.5
OTC	50.33	16.88	Atmel Corp. (H)	46.75	-2.12	-4.9
OTC	7.50	2.75	Chips and Technologies	6.06	0.13	2.1
OTC	46.62	13.00	Cirrus Logic	35.50	-0.25	-2.0
NYS	30.88	9.38	Cypress Semiconductor Corp	37.38	1.62	0.0
NYS	20.00	11.75	Dallas Semiconductor (H)	18.00	-1.38	7.8
OTC	74.50	42.75	Intel Corp	60.13	-1.63	-2.9
NYS	22.63	10.50	LSI Logic Corp. (H)	21.75	-0.50	2.2
OTC	26.75	12.25	Lattice Semiconductor	18.63	0.13	0.7
NYS	85.50	19.25	Micron Technology (H)	80.63	-1.12	-1.5
NYS	109.75	63.63	Motorola Inc. (H)	103.25	-4.95	-4.7
NYS	25.00	12.00	National Semiconductor (H)	22.00	-1.50	-4.4
OTC	12.25	6.50	Sierra Semiconductor	8.50	0.38	-4.2
NYS	89.50	51.62	Texas Instruments (H)	83.00	5.13	-6.0
OTC	18.88	6.50	VLSI Technology	15.63	0.50	3.3
OTC	14.38	5.12	Weitek	8.38	-0.13	-1.5
ASE	20.38	3.63	Western Digital Corp (H)	18.00	1.00	-9.4
OTC	58.75	29.75	Xilinx (H)	53.75	-2.00	-3.6
OTC	40.75	21.50	Zilog Inc	34.75	1.75	-4.8

Peripherals and Subsystems — Off 1.1x%

Exch	52-Week Range			Mar. 25 Close	Wk Net Change	Wk Pct Change
OTC	29.50	12.25	American Power Conversion (H)	26.75	1.88	-6.5
OTC	24.75	15.50	BancTec Inc	23.13	-0.38	-1.6
OTC	11.25	2.50	Cambex Corp	4.75	0.44	10.1
ASE	8.25	3.00	Cognitronics Corp	4.38	-0.13	-2.8
NYS	20.50	9.00	Conner Peripherals	16.13	-0.75	-14.6
OTC	38.75	17.50	Creative Technologies Inc	23.25	-8.25	-26.2
OTC	25.00	6.50	Data Race Inc.	9.25	0.38	4.2
ASE	11.83	5.00	Dataram Corp (L)	5.63	0.38	7.5
NYS	21.00	5.83	EMC Corp (H)	21.38	3.13	-3.0
OTC	12.25	5.25	Emulex Corp	12.25	0.00	0.0
OTC	21.00	14.25	Evans & Sutherland	19.00	0.50	2.7
OTC	22.50	7.50	Exabyte (H)	21.38	-0.38	-1.7
OTC	34.00	7.50	Intelligent Info. Systems	8.25	-0.50	5.7
OTC	3.13	2.25	Iomega Corp	2.50	0.06	2.3
OTC	9.75	5.75	IPL Systems Inc.	8.25	0.38	4.8
OTC	28.50	13.75	Komag Inc.	24.75	-1.00	3.9
OTC	8.75	4.38	Maxtor Corp.	8.13	0.63	8.2
OTC	8.38	4.88	Micropolis Corp. (H)	7.62	0.00	0.0
NYS	117.00	97.88	3M Corp (L)	89.38	-2.25	-2.2
OTC	8.50	6.75	Printronix Inc.	8.25	0.63	7.2
NYS	37.25	7.50	QMS Inc.	8.50	-0.88	-9.3
OTC	20.75	9.38	Quantum Corp	17.63	1.25	-6.6
OTC	9.33	3.13	Radius Inc	8.50	-0.13	-1.4
NYS	17.75	11.75	Recognition International	33.13	0.25	6.1
OTC	6.88	3.63	Rexon Inc.	6.50	0.00	0.0
OTC	28.75	13.13	Seagate Technology	25.00	1.38	-11.9
NYS	45.00	21.75	Storage Technology	35.38	-2.38	-6.3
NYS	32.63	21.38	Tektronix Inc. (H)	21.13	1.25	4.2
NYS	103.25	69.88	Xerox Corp	97.75	-1.75	-1.8

Services — Off 1.80%

Exch	52-Week Range			Mar. 25 Close	Wk Net Change	Wk Pct Change
OTC	21.75	14.88	American Mgmt. Systems	19.88	0.41	3.0
NYS	6.75	2.38	Anacomp Inc	4.13	0.38	10.0
OTC	23.50	14.50	Analysts Int'l	17.50	1.25	7.9
NYS	56.88	46.88	Auto Data Processing	53.75	1.00	-1.8
NYS	23.88	13.00	Ceridian Corp. (H)	22.88	-1.38	-5.7
NYS	24.25	13.88	Comdisco Inc.	22.00	-0.25	-1.1
OTC	11.88	4.56	Computer Horizons (H)	13.00	-0.37	-2.9
NYS	41.75	23.34	Computer Sciences	38.88	-0.50	-1.2
NYS	8.75	6.00	Computer Task Group	8.00	0.25	3.2
NYS	35.00	17.38	CompUSA Inc.	21.00	-0.38	-1.8
OTC	14.00	8.75	Control Data Systems Inc.	9.88	-0.50	-5.2
OTC	16.00	7.00	Corporate Software	35.38	0.00	0.0
OTC	11.00	6.63	Egghead Discount Software	8.50	-0.25	-2.8
NYS	86.25	36.00	General Motors E (EDS) (H)	36.25	2.63	7.8
OTC	22.75	12.75	Inacom Corp	18.25	-0.25	5.9
OTC	28.00	12.00	Intelligent Electronics	25.75	-1.00	5.7
OTC	22.13	9.75	Merisel	22.00	0.38	1.7
OTC	32.50	8.16	MicroAge Inc. (H)	31.13	-0.61	2.0
OTC	40.50	23.84	Paychex	35.25	-2.50	-6.6
NYS	87.75	21.63	Policy Management Sys.	54.75	-2.50	-4.7
NYS	24.38	36.00	Reynolds and Reynolds	23.00	-0.75	3.2
OTC	28.50	13.63	SEI Corp.	23.50	0.13	0.3
OTC	29.13	17.50	Shared Medical Systems (H)	37.63	1.13	3.9
OTC	12.62	5.63	SHL Systemhouse	7.25	-0.38	-4.9
OTC	30.75	14.50	Software Spectrum Inc.	14.50	2.50	14.7
OTC	42.75	28.00	SunGard Data Systems	37.25	-2.00	-5.3

Key: (H) = New annual high reached in period (L) = New annual low reached in period

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INDUSTRY PULSE: Telecommunications

Carrier revenue

Company	Calendar year 1993 (in billions)	Percent change from 1992 to 1993
AT&T	$39.86	0.7%
Bell South	$15.89	4.5%
GTE	$15.83	(0.2)%
Nynex	$13.41	1.8%
Bell Atlantic	$12.99	2.3%
MCI Communications	$11.98	12.9%
Ameritech	$11.71	5.0%
Southwestern Bell	$10.69	6.7%
US West	$10.40	3.6%
Pacific Telesis Group	$10.00	3.0%
Sprint Corp. (Long distance only)	$6.14	8.5%
Sprint Corp. (local exchange service)	$4.13	6.8%

Source: Gartner Group, Inc.'s Yardstick, 1994, Stamford, Conn.

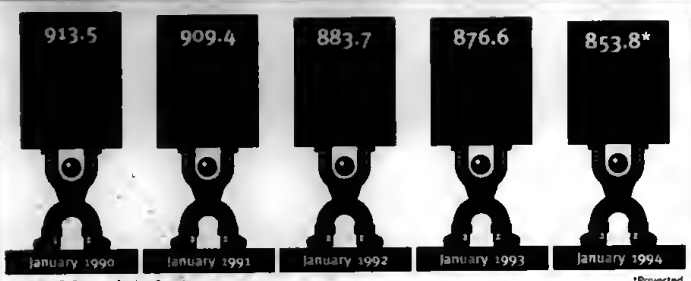
Emerging services and technologies market (in millions)

	1992	1993	1994*	1995*	1996*
Frame relay service		$57.0		$336.9	
Switched Multimegabit Data Service		$4.1		$40.0	
Asynchronous Transfer Mode service		$54.0		$342.4	

*Projected

Source: North American Telecommunications Association's "1993-1994 Telecommunications Market Review and Forecast," Washington

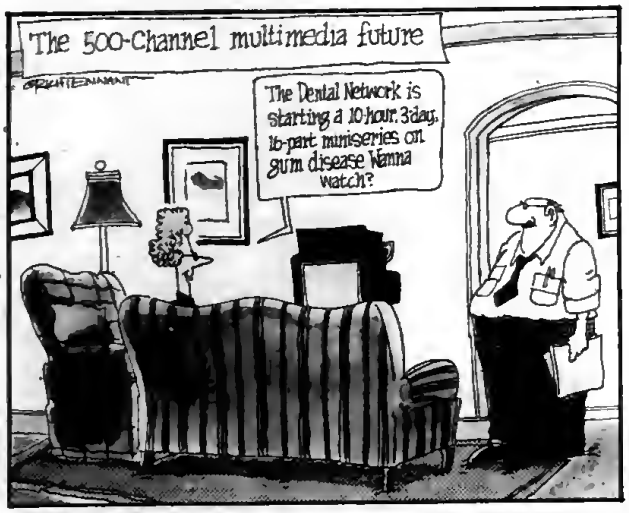
Total employment (in thousands)



Source: U.S. Bureau of Labor Statistics

*Projected

The 5th Wave *by* Rich Tennant



Inside Lines

Summertime Notes for AIX and HP/UX

Lotus cracked the lid just a little wider last week on its plans for Unix versions of Notes. Last week, at the '94 PC Forum conference in Phoenix, Lotus Senior Vice President John Landry said HP/UX and AIX users can expect native Notes implementations sometime this summer, with the HP/UX version leading by four to six weeks.

Will Kahn tough it out at Borland?

Borland CEO Philippe Kahn said last week he will remain in charge "as long as shareholders want me to" but acknowledged that his performance in the past year has sometimes been poor. Also wavering was his commitment to go ahead with Sidekick for Windows, which is in beta testing and is likely to sell for less than $40.

Thinking caps for commercial users . . .

Thinking Machines plans to announce marketing deals with database makers Oracle and Dharma next week that will be targeted at commercial — not scientific — users of its massively parallel systems. IS managers from American Express' Epsilon project are expected to be at the Cambridge, Mass., meeting to stump for Thinking Machines' MPP technology. Epsilon is a giant data mining project that aims to build a view of Americans based on what people buy with Amex cards.

Amdahl goes massive with Oracle and NCube

Amdahl will announce tomorrow an alliance with Oracle and NCube to build a massively parallel database query engine for large corporations with distributed computers, sources said. The system will reportedly use connectivity software from Information Builders to link Amdahl's large-scale mainframes with an NCube MPP machine running a parallel Oracle server.

Year-end ship date for Chicago still holds

A senior Microsoft official last week stood his ground on the late 1994 ship date promised for Chicago. The official, who asked not to be named, said the only remaining question is whether Microsoft can make its internal Halloween ship target. Apparently the company anticipates a major holiday selling season and would like to see Chicago under a lot of trees this year.

Sun brightens up its object strategy

SunSoft will be publishing a roadmap for the company's object strategy next week at the Sun developer's conference, industry sources said. Included in the announcement are expected dates for integrating Project Distributed Objects Everywhere with products from Next and Iona Technologies, Inc., as well as interoperability with OLE and other implementations of CORBA, such as IBM's Distributed System Object Model.

Will the next Ray Noorda please stand up?

The rumor mill at Novell's Brainshare conference last week tagged IBM honcha Ellen Hancock as the most likely outsider to succeed Ray Noorda for the Novell CEO slot. She did deliver the keynote speech at the developer's conference and later lunched with Ray, but former Apple CEO John Scully is said to be a popular choice as well. Insider favorites include John Edwards and Ad Rietveld, president and CEO of Novell's future subsidiary, WordPerfect.

Three-peat for Digital

On April 12, Digital plans to make the third in a series of announcements aimed at convincing customers it deserves a place in the client/server world. Among the anticipated hardware announcements is a four-processor, superserver-class Alpha AXP machine, code-named Sable. It will use the Peripheral Component Interconnect bus and run Windows NT plus DEC OSF/1 and OpenVMS. Pricing will start at $25,000.

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